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CHEM-NUCLEAR SYSTEMS, LLC

140 Stoneridge Drive • Columbia, South Carolina 29210 • (803) 256-0450

July 20, 2005

HAND DELIVERED

Mr. Charles Terreni
Chief Clerk & Administrator
South Carolina Public Service Commission
Synergy Business Park
101 Executive Center Drive
Columbia, SC 29210

Dear Mr. Terreni:

In accordance with the requirements of the SC Code Ann. §48-46-40(B)(6) (1976), (the Atlantic Interstate Low-Level Radioactive Waste Compact Implementation Act), please find enclosed ten (10) copies of the Fiscal Year 2005/2006 Least Cost Operating Plan of Chem-Nuclear Systems, LLC. Please file the copies of the Plan as your administrative procedures provide.

If you have any questions with respect to this matter, please do not hesitate to contact me (758-1825).

Sincerely,

Deborah G. Ogilvie

Deborah G. Ogilvie
Public Information Director

Enclosures

BEDL-05-022

FY 2005/2006

LEAST COST OPERATING PLAN

BARNWELL DISPOSAL FACILITY

CHEM-NUCLEAR SYSTEMS

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1.0 INTRODUCTION

Chem-Nuclear Systems, LLC (CNS) operates a low-level radioactive waste (LLRW) disposal facility located approximately five miles west of the City of Barnwell, in Barnwell County, South Carolina. The disposal site comprises approximately 235 acres of property owned by the State and leased by CNS from the South Carolina Budget and Control Board (SC B&CB).

LLRW arrives at the disposal site by truck or heavy-haul transporter. Waste packages may arrive in shielded "casks" (containers of various sizes constructed of steel and lead), in shielded or unshielded vans or on flatbed trailers. Each shipment is inspected at the site and released for disposal. Disposal generally involves removing the waste package from its transportation vehicle and placing the package in a vault in an engineered trench. The filled vaults are covered with soils and the completed trenches are covered with a multi-layer engineered earthen cap.

1.1 Purpose

CNS submits this Least Cost Operating Plan (LCOP) to the South Carolina Public Service Commission (Commission) as required by the S.C. Code Ann. 1976 Section 48-46-40 (B)(6)(supp. 2002). This LCOP is the fifth annual update.

1.2 Scope

The LCOP describes the facility and its operations, significant events in the history of South Carolina's LLRW disposal site and regulatory/statutory requirements that affect disposal site operations. The LCOP provides information concerning anticipated operations over the next ten years including evaluations of future staffing and operation of the site to ensure least cost operations as well as information related to possible interim suspension of operations.

This plan update includes information from the Operations and Efficiency Plan (O&E Plan) submitted to the Commission June 26, 2002, and the Report of the Collaborative Review of the O&E Plan submitted to the Commission June 16, 2003 (collaborative review). The O&E Plan was prepared by Project Time and Cost (PT&C), Inc., in accordance with Commission Order No. 2001-499. The collaborative review was conducted in response to Commission Order No. 2003-188.

2.0 HISTORICAL BACKGROUND

This section provides a brief history of regulatory and legislative actions, and associated changes to the licensed disposal area, trench construction and maintenance, waste characterization and packaging. The elements of this section provide the perspectives under which the LCOP has been developed.

2.1 Regulatory Documents

Three major documents govern the Barnwell site, its operation and disposition. These documents are the Lease Agreement and its amendments, South Carolina Radioactive Material License 097 (License 097) and the Decommissioning Trust Agreement of 1981.

Lease Agreement and Amendments: CNS entered into a 99-year lease agreement with the SC B&CB on April 21, 1971, to lease 17.2 acres of land, previously deeded to the State by CNS, for the purpose of burial of radioactive waste. Under this agreement, CNS agreed to operate in accordance with its license application, the conditions of its License 097 and the requirements of the U.S. Atomic Energy Commission. The agreement also established a requirement for payments to an Extended Care Maintenance Fund for the long-term care of the site. Under §48-46-40(B)(6) of the S.C. Code (as amended), the Extended Care Maintenance Fund provides funding for long-term care as well as closure activities and post closure maintenance and monitoring after the Decommissioning Trust Fund is exhausted.

In the original agreement, CNS agreed to pay eight cents into the Extended Care Maintenance Fund for every cubic foot of waste received for burial. The Lease Agreement was amended on April 6, 1976, replacing the previous agreement and expanding the lease area to its present 235 acres. At the same time, the fund payment was increased to sixteen cents per cubic foot. The agreement included a formula for increasing the rate of payment based on the Consumer Price Index. Since 1976, the payment to the Extended Care Maintenance Fund has been set at $2.80 per cubic foot of waste. Other conditions of the lease have remained essentially the same since inception.

As of July 1, 2005, there is approximately $24,302,577 in the Extended Care Maintenance Fund. An additional $20,472,134 is to be paid to the fund from the South Carolina Department of Revenue as directed by South Carolina FY 2005/2006 Budget, Part 1B, Section 73.17 (SR: Increased Enforcement Collections). The State Treasurer will disburse these funds to the fund quarterly beginning December 31, 2005.

South Carolina Radioactive Material License 097: License 097 governs operations and closure of the Barnwell site. In 1969, it was issued by the South Carolina Department of Health and Environmental Control (DHEC) authorizing receipt and storage of LLRW. Following extensive geohydrological investigations the license was amended in 1971 to authorize disposal of LLRW by shallow land burial. State and federal agency involvement and DHEC approval preceded authorization for burial.

License 097 specifies requirements by which CNS operates the disposal site. The license describes trench construction specifications, backfilling and capping requirements, and required trench markings. Requirements for acceptable wastes are covered as well as specific documentation that

must accompany each shipment from the generator. Waste shipments and vehicles must comply with United States Department of Transportation (DOT) regulations for transport and receipt at the site and even more stringent license conditions for acceptance, burial and vehicle release.

License 097 has been amended forty-eight times since it was issued in 1969. Amendments cover a range of changes, from modifying a single license condition to a complete rewrite consolidating several previous amendments into a single document. The amendments have resulted in positive changes and improvements to the burial site and its long-term integrity. An application to renew the license was submitted to DHEC April 27, 2000, and site activities continue with the license in timely renewal status.

Decommissioning Trust Agreement of 1981: On March 24, 1981, CNS entered into a Trust Agreement with the State of South Carolina to provide monies for establishment of a Decommissioning Trust Fund. This fund contains sufficient monies to decommission and stabilize the site in accordance with the requirements of the 2005 Closure Plan. In 1981, at the time CNS entered into the Trust Agreement, CNS contributed a lump sum of approximately $1.7 million to the decommissioning fund. No additional contributions were made until April 1, 1993, when a rate of $4.11 per cubic foot of waste received for disposal at the Barnwell site was contributed to the fund. This contribution rate lasted for three months. Soon thereafter, contributions were set at $12.60 per cubic foot effective January 1, 1994, to cover costs of enhanced capping at the Barnwell site. On July 1, 1995, the contribution rate was reduced to the current $4.20 per cubic foot.

The current fund balance is approximately $19.2 million (as of July 1, 2005). At current contribution rates and projected volumes, the fund balance will provide sufficient monies to cover the costs of closure. The Extended Care Maintenance Fund can be used for any remaining closure activities when the Decommissioning Trust Fund is exhausted [SC Code Ann. 1976 Section 13-7-10(11) (Supp. 2002)].

2.2 Regulatory/Political History

During the early 1970's, the Barnwell site was one of six commercially operated disposal sites. By 1979, three of the commercial sites (in Illinois, Kentucky and New York) had closed, and the Barnwell site was receiving more than three-fourths of the nation's waste.

The increased rate of waste receipt led to South Carolina establishing limits on the annual volume of waste allowed to be received at the site. The volume restriction program gradually reduced allowable volume by one-half over a two-year period (1979-1981) to 1.2 million cubic feet per year. This restriction remained in effect until statutes were amended in 2000, which established the current limits on volume.

During 1979, South Carolina developed and promulgated Regulation Number 61-83, "Transportation of Radioactive Materials Into and Through the State of South Carolina." This regulation established a permit system for waste generators shipping LLRW in the State, and a prior notification system to provide DHEC and CNS advance notification of shipments passing through the State and arriving at the site. The system requires that shippers certify shipments have been inspected and meet the requirements of appropriate regulations and license conditions.

In 1980, the U.S. Congress passed the Low-Level Radioactive Waste Policy Act. The Act established three major policies. First, each state is responsible for the low-level waste generated within its boundaries. Second, states may form compacts (or groups of states) to facilitate managing low-level waste generated within the boundaries of the compact states, including the right to deny disposal of out-of-compact wastes at compact disposal facilities. The Act also established the policy that these compacts could not refuse waste from other states until the U.S. Congress had ratified the compact. The Southeast Compact, consisting of eight southeastern states (Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, Tennessee and Virginia) was formed, with the Barnwell site designated the regional facility.

In December 1982, NRC promulgated 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Wastes," which became effective in December 1983. This regulation specifies technical requirements applicable to the different phases of a disposal facility: licensing, operations, closure, post-closure surveillance and institutional control. As a matter of Agreement State compatibility, DHEC adopted 10 CFR Part 61 – equivalent regulations.

On January 1, 1986, the Low-Level Radioactive Waste Policy Amendments Act was signed into law, making a generator's continued access to the three operating disposal sites contingent on its compact meeting specified milestones for new site development. The amended Act clarified Congress' intent to require compacts (or individual states not within a compact) to provide disposal capacity for LLRW generated within their boundaries by January 1, 1993. The legislation also defined the LLRW for which states are responsible. It mandated Federal responsibility for all waste for which states are not responsible above NRC 10 CFR Part 61 Class C limits. The amended Act also established conditions for access to operating disposal sites during the interim period, allowed the partial rebate of surcharges to states and compacts which meet statutory milestones, and established penalties for states that fail to meet the mandated site development goals. A US Supreme Court decision in 1992 struck down the penalty portion of the amended Act.

The South Carolina General Assembly (SCGA), in its 1992 session, enacted legislation to allow the Barnwell site to continue as the regional facility until December 31, 1995 subject to several conditions. One

condition required states outside the Southeast Compact demonstrate progress in developing their own regional disposal sites in order to retain access to the Barnwell facility during an 18-month period (January 1993 through June 1994). After June 30, 1994, the Barnwell facility would accept only waste from Southeast Compact generators. By 1995, continued delays in building a new regional disposal site led South Carolina's governor to propose legislation to withdraw the state from the Southeast Compact.

In June of 1995, the SCGA enacted the legislation, South Carolina withdrew from the Southeast Compact, and the Barnwell facility began accepting waste from generators in all states except North Carolina and the Northwest Compact. North Carolina was restricted from site use due to its failure to develop the next disposal facility. The Northwest Compact states disposed of their LLRW at a facility in Washington. South Carolina also imposed a $235 per cubic foot tax on all waste received for disposal at the Barnwell facility. Proceeds from this tax went to the Children's Education Endowment Fund and have been used for educational scholarships and school construction.

Effective July 1, 2000, the SCGA passed legislation enabling South Carolina to join the Atlantic Compact (formerly the Northeast Compact). Provisions in the legislation limit waste volumes on a yearly basis, repeal the tax, and after June 30, 2008, restrict acceptance of waste to three states: South Carolina, Connecticut, and New Jersey.

2.3 Licensed Disposal Area

The initial licensed area consisted of approximately 17.2 acres purchased by CNS. In April 1971, this tract was deeded to the State of South Carolina, which leased this acreage back to CNS for disposal operations. This tract of land was part of a larger property evaluated and found suitable for use as a disposal site during the site's licensing phase (1969 to 1971). The Lease Agreement was amended in 1976, enlarging the licensed disposal area to the current 235 acres.

2.4 Trench Construction

The original document permitting burial at the Barnwell site was issued April 1971 as Amendment 3 to License 097. Since that time, trench design and construction methods have evolved as technologies have improved and regulations changed.

2.4.1 1971 to 1983

As specified in Amendment 3, the first trenches were shallow earthen excavations. The waste was placed into these excavations, surrounded and covered with backfill material, then capped with clay. The clay cap was covered with a sheet of 10-mil

plastic, over which additional protective soil was placed. Trench excavations were required to be located above the water table.

Amendment 5 (April 1973) established several new trench design requirements, including standardized trench dimensions. This amendment also required that a gravel-filled drainage field (French drain) be placed in the bottom center of the trench, running the length of the trench. Monitoring pipes located at specific intervals were placed in the French drain. Trench floor sand, surrounding and covering the French drain, was also incorporated into the trench design. The trench cover was reduced in thickness by one foot and no longer included 10-mil plastic.

Amendment 12 (December 1975) established design criteria for the slit trench. The new slit trench design was like other trenches except length and width were greatly reduced. This trench was designed to provide a disposal method for higher activity waste such as irradiated reactor hardware. Amendment No. 12 also required placing the French drain and monitoring standpipes along the sidewall of trenches to reduce the possibility of pipe damage during waste placement.

Amendment 15 (July, 1977) allowed larger trenches to be constructed. The larger trench size allowed CNS to arrange waste more efficiently to make better use of trench space and to reduce personnel exposure by using low-activity waste as shielding. This amendment also changed cover design, requiring a minimum thickness of clay and general earth cover.

2.4.2 1983 to 1996

At the end of 1982, NRC regulation 10 CFR 61 was promulgated. License 097, Amendment 36 facilitated the implementation of 10 CFR 61 at the Barnwell site by requiring segregation of wastes according to waste class. Amendment 36 describes the use of three separate trench designs to segregate wastes. The new trench designations were Class A, slit trench (C-type), and B/C waste trench.

Amendment 36 also established the practice of installing intrusion barriers on trenches with Class C waste. In response to this change, CNS installed intrusion barriers on all previous slit trenches. The slit trench design was also changed to incorporate a keyway. This keyway arrangement reduced offload crew exposure because waste offloading could now occur below the site's general surface grades.

In 1988, CNS improved the design of the trench floor French drain system based on an evaluation of the existing system and trench drainage properties. CNS changed trench standpipes and screens

from polyvinyl chloride (PVC) to stainless steel and the French drain gravel materials to a coarse sand. The steel pipe provides greater resistance to collapse and bending during trench disposal and backfilling operations, and the sand minimizes the infiltration of fines into the French drain.

Amendment 45 (January 1990) required that CNS place polyethylene high integrity containers (HICs) containing Class B or C wastes in concrete vaults. This change was made to resolve concerns regarding the long-term stability of the polyethylene HICs.

In 1991, CNS changed cap design to reduce the likelihood and size of subsidence features on CNS trench caps.

During 1993, CNS began placing slit trench wastes in concrete vaults, eliminating the need for separate concrete intrusion barriers on subsequent slit trenches.

2.4.3 1996 to Present

Amendment 46 (August 1995) required several substantial changes to trench design and construction. These changes included placing all waste in concrete vaults (unless otherwise approved by DHEC), modifying the French drain system in the Class A trench and covering all future trenches with enhanced multi-layer earthen caps.

In 2004, CNS changed trench backfill material type and installation methods to minimize settlement and subsidence on trench covers. CNS recommended and DHEC approved use of free-flowing materials for backfill in most trenches. CNS also committed to using specific equipment to fill the voids between disposal vaults.

To address the anticipated reduced waste volumes after June 30, 2008, CNS may need to modify trench designs. Through this design process, CNS will consider findings of the vault and trench configuration analysis provided in the O & E plan. Under current operating conditions, the O & E plan demonstrated that current trench designs and vault configurations are least cost strategies.

2.5 Waste Form/Packaging Requirements History

Since the start of waste disposal at the site in the early 1970's, many changes have occurred affecting the acceptability of wastes, waste packaging and methods for disposal. This section describes the history of waste types received and disposal methods.

Waste types disposed in the first years of operations included utility wastes consisting of dewatered resins, absorbed liquids and Dry Active Waste (DAW). CNS also received institutional and industrial wastes in the form of biological materials, absorbed liquids, liquid scintillation vials

surrounded with absorbent material (e.g., vermiculite), general laboratory trash, DAW, source and special nuclear materials (SNM; LLRW contaminated with small amounts of plutonium and certain isotopes of uranium). These wastes were generally packaged in metal drums, wooden or metal boxes and steel liners. A considerable amount of biological waste containing mostly tritium and carbon-14 radioisotopes was packaged in paper or cardboard containers.

In April 1974, DHEC prohibited the receipt of utility-generated liquids processed in absorbent materials. These liquids had to be processed by cement solidification. The license was amended in July 1977 to broaden the list of acceptable solidification media. In May 1979, scintillation liquids were prohibited from site disposal. Also, institutional liquids had to be solidified.

A change to the license in July 1981 required all ion-exchange resin and filter media bearing isotopes with half-lives greater than five years and combined activity of one microcurie per cubic centimeter, to be solidified or placed in a DHEC-approved HIC. Biological wastes were required to be double-packaged in metal containers with absorbent material and lime added to the waste and the interstitial space between containers filled with absorbent materials. These requirements continue to the present.

The operational requirements of 10 CFR Part 61 were implemented at the site during 1982. These requirements directed certain waste, based on specific radionuclides and concentrations, to be processed/packaged in a more stable form. Since most of these wastes were already packaged in HICs, the biggest effect was the requirement to segregate waste into separate trenches based on waste classification.

In 1989, NRC concluded that the current design of polyethylene HICs did not meet long-term stability requirements. A concrete vault was approved by DHEC to allow continued disposal of Class B and C waste in the polyethylene HICs.

Since 1996, CNS has buried all waste in DHEC-approved vaults. These vaults are designed to improve long-term trench stability and also provide structural stability to waste packages. With DHEC's prior approval, large components such as steam generators, pressure vessels or reactor coolant pumps are qualified for disposal using methods such as filling the shipping container with cement grout or defining the component exterior shell as comparable to a vault.

In 2003, DHEC authorized placement of different waste classifications in a single trench provided "stable" and "unstable" wastes remain segregated by vault.

2.5.1 Radionuclide Reporting History

Wastes received for disposal are documented on shipment/disposal manifests. The manifest has evolved during the site's history to meet regulatory requirements and site reporting needs. During the early years of disposal, the manifest did not require specific radionuclide information. Often, only the single most abundant radionuclide or a small percentage of the nuclides were listed. During the late 1970's and early 1980's, radionuclide reporting improved as a result of regulatory reporting changes. Isotopes such as carbon-14, tritium, etc., (usually shipped by private industries and universities) were specifically listed on the manifests enabling their existence and quantities to be traced back to their origin. However, in the case of power plant generated wastes, nuclide reporting was still limited mainly to the more abundant nuclides such as easily identified gamma emitters.

In 1983, radionuclide reporting vastly improved to meet 10 CFR Part 61 waste stabilization and classification requirements. Specific waste stream samples from power plants were analyzed by independent laboratories for hard-to-identify radionuclides. Scaling factors were also developed to better estimate radionuclides in waste streams.

2.5.2 Waste Volume History

Table 2.5.2-1 lists the total waste volume received each year. After 2000, burial volumes are totaled over the fiscal year, which extends from July 1 to June 30.

Table 2.5.2-1
Barnwell Burial Volumes

Year	Volume (cubic feet)
1971	50,219.34
1972	159,933.47
1973	599,886.28
1974	624,759.55
1975	643,564.44
1976	1,393,587.55
1977	1,636,425.12
1978	2,220,519.72
1979	2,238,322.13
1980	2,444,810.72
1981	1,543,278.67
1982	1,228,200.83
1983	1,240,668.21
1984	1,231,715.28
1985	1,214,422.99

Table 2.5.2-1 Barnwell Burial Volumes	
1986	1,053,791.68
1987	958,275.82
1988	931,974.01
1989	1,103,299.56
1990	788,031.90
1991	789,681.85
1992	828,727.84
1993	605,443.07
1994	733,896.31
1995	484,890.82
1996	325,815.32
1997	222,269.48
1998	195,684.08
1999	166,435.79
2000 (Jan-June)	69,197.42
FY 2000/2001	125,988.99
FY 2001/2002	57,763.15
FY 2002/2003	65,660.02
FY 2003/2004	59,515.00
FY 2004/2005	43,260.45
Total	28,079,916.86

3.0 REGULATORY REQUIREMENTS

CNS operates the Barnwell site in accordance with the following regulatory requirements.

3.1 Disposal Facility Radioactive Material License Number 097

CNS is authorized to receive, store and dispose of radioactive material as LLRW in accordance with all conditions found in License 097. The license conditions are subdivided into the categories described below.

3.1.1 General Conditions

The General Conditions specify the location of the disposal facility, regulatory requirements, personnel training requirements, authorized users, record retention, site operation inspections and operating parameters.

3.1.2 Receipt, Acceptance and Inspection Conditions

The Receipt, Acceptance and Inspection Conditions specify shipment and disposal documentation required for receipt and disposal of low-level radioactive waste, reporting criteria, shipment inspection criteria and unusual hazard notifications.

3.1.3 Waste Characteristics and Waste Form Conditions

The Waste Characteristics and Waste Form Conditions specify waste classification requirements, acceptable waste forms, documentation for particular waste forms, packaging criteria for particular waste forms, package activity limits for particular waste forms and prohibited waste.

3.1.4 Contamination Limit Conditions

The Contamination Limit Conditions specify contamination limits for incoming shipments of radioactive waste and incoming vehicles. These conditions also specify the release criteria for vehicles.

3.1.5 General Packaging Conditions

The General Packaging Conditions specify the minimum requirements for disposal packages and lifting attachments.

3.1.6 Site Design, Construction and Maintenance Conditions

The Site Design, Construction and Maintenance Conditions specify the disposal trench design, construction, approvals and maintenance. These conditions also specify the backfilling of trenches, erosion control, trench inspection procedures, trench closure, unauthorized entry and trench marker requirements.

3.1.7 Burial Operation Conditions

The Burial Operation Conditions specify methods for waste emplacement, vault design and construction, radiation and contamination controls, and waste storage limits.

3.1.8 Environmental Surveillance Conditions

The Environmental Surveillance Conditions specify the on-site and environmental monitoring programs, surveillance reporting criteria, license transfer requirements, and site closure and stabilization plan criteria.

3.2 Regulatory Requirements

CNS operates the disposal site in accordance with all applicable state and federal regulations. The following sections identify and briefly describe each applicable regulation.

3.2.1 South Carolina Regulation 61-63, Radioactive Materials, Title A

Regulation 61-63 specifies the requirements for the possession, use and disposal of radioactive material. The requirements discuss general provisions, licensing, radiation protection, notices and reports and land disposal of low-level radioactive waste.

3.2.2 South Carolina Regulation 61-83, Transportation of Radioactive Waste Into or Within South Carolina

Regulation 61-83 specifies the requirements for the Barnwell site operator to report any shipper violations, ensure all generators and shippers have valid transportation permits and notify shippers of any special requirements for delivery to the Barnwell site.

3.2.3 US Nuclear Regulatory Commission, 10 CFR 71.12(b)

10 CFR 71.12(b) requires the operator of any NRC approved package (transport cask) to have an approved QA program in accordance with 10 CFR 71 Subpart H and to be registered with the NRC for each package they will operate. CNS operates in accordance with the Duratek Quality Assurance Program under the USNRC Approval No. 0496, and Duratek is the listed registered user of the USNRC approved packages received at the disposal site.

3.2.4 South Carolina Storm Water NPDES Permitting Regulation 61-9

Regulation 61-9 specifies that activities or facilities associated with industrial activity, such as a landfill, must posses a National Pollution Discharge Elimination System (NPDES) permit for storm water discharge.

3.2.5 Other Regulatory Requirements

CNS disposal operations must also comply, as applicable, with the following regulatory requirements:

- South Carolina State Primary Drinking Water Regulation 61-58
- South Carolina Hazardous Waste Management Regulation 61-79
- Code of Federal Regulations, Title 29, Chapter XVII – Occupational Safety and Health Administration
- South Carolina Air Pollution Control Regulations and Standards, Regulation 61-62

4.0 FACILITY DESCRIPTION

4.1 Licensed Disposal Area

The 235 acre licensed disposal area is divided into different use categories including: completed trenches, planned trench areas, and ancillary facility, water management and buffer zone areas (see Table 4.1-1).

Table 4.1-1
Barnwell Site Land Designations

Designation	Acreage
Licensed Disposal Area	235
Area Used for Disposal Since 1971	105
Future Trench Area	10
Other Leased Property (including buffer zone, water basins, ancillary operations and other areas currently unsuitable for disposal)	120

As of July 1, 2005, CNS estimates remaining disposal site capacity at approximately 2.58 million cubic feet. To estimate current remaining capacity, CNS reduced its approved 1999 estimate by the waste volume disposed since that time. Future capacity estimates will depend on trench and vault configurations and suitability of site areas.

4.2 Disposal Trenches

Current Barnwell site trench design and construction practices are governed by an approved CNS trench construction procedure and trench construction details drawings for each trench type. In accordance with License 097, changes to these documents are approved by DHEC prior to implementation.

CNS currently uses three engineered trench designs primarily to segregate waste by dose rates external to the waste packages. The three types of trenches are Class A, Class B/C, and slit-type trench. The last significant changes to trench design came into effect January 1996 to comply with changes incorporated in Amendment 46 of License 097. Changes included (1) requiring all waste be placed in concrete disposal vaults, (2) placing enhanced caps on all trenches, and (3) improving infiltrate water collection in the large Class A trenches. Trench types are described below.

The Class A trench is the largest of the three trench types at Barnwell. The trench floor is sloped to trench corner locations, and a trench drainage system is installed to facilitate monitoring of water infiltration entering the trench. Waste is generally disposed of in the Class A trench in rectangular and cylindrical reinforced concrete vaults, which are stacked

up to three-high on the trench floor. Voids between vaults are filled with free-flowing soils (backfill) materials. As disposal proceeds, filled vaults are covered with a variable amount of general cover soils and an initial clay cap.

The Class B/C trench is used for disposal of stable wastes, primarily Class B and Class C wastes (not including irradiated hardware and large sealed sources). A French drain and sump system on the floor of the B/C trench allows monitoring of any water that accumulates in the trench. Voids around disposal vaults are filled with free-flowing materials. Vaults are covered like Class A disposal vaults with an initial clay cap and then a multi-layer enhanced cap. The enhanced cap is normally installed over several adjacent filled trenches at the same time. The disposal vault lids serve as an intrusion barrier for Class C waste buried within.

The slit trench is used for disposal of irradiated hardware and large-quantity sealed sources. Trenches are narrow to facilitate remote offload, shielding, and rapid covering of waste. The size allows a two-high stack of slit trench concrete disposal vaults. The entire trench floor is filled with coarse drain sand and sloped to one end. Standpipes to monitor water accumulation are installed periodically along the length of trench. Disposal vaults in the slit trench are backfilled and covered with clay-rich materials. An enhanced cap identical to that used for Class A and B/C trenches is installed above backfill materials. The concrete disposal vault lids serve as intrusion barriers, required for Class C waste.

For all trench types, CNS has developed and documented, through its procedures, backfilling methods to maximize filling of voids around vaults and to enhance long-term stability of the entire trench system.

A multi-layer enhanced cap is installed following completion of disposal in a trench or a group of adjacent trenches. The enhanced cap consists of the initial clay cap overlain by polyethylene and bentonite mat materials, a sand drain layer and general soil materials (for vegetation growth). As part of the enhanced cap construction, trenches are covered with topsoil and seeded with grass. Trench standpipe, wellhead protective pads and trench corner and identification markers are installed last.

4.3 Site Support Facilities

CNS maintains several facilities on and adjacent to the Barnwell site, some directly supporting site operations and others related to parent company business lines. Table 4.3-1 lists those existing facilities supporting the disposal operation, their current use and location. Disposal operations facilities are described below.

Receiving Warehouse No. 2 is the point of receipt and inspection for shipments of non-waste materials and supplies to the disposal site and other facilities in the Barnwell complex. Goods are inventoried and stored here until needed and certain routine supplies are kept and dispositioned

from this location. CNS also stores selected environmental samples at a secured location in this building.

Warehouse No. 3 is primarily used for storage of materials and supplies associated with parent company activities, such as ion-exchange media and waste processing equipment. However, CNS also uses the facility as a geological core storage area, in support of disposal site characterization.

The Administration Building houses most of the disposal site administrative staff including Site Management, Security, Personnel, Finance and Regulatory Affairs. The main access gate is adjacent to the building and controlled by Security whose office overlooks the gate. The Administration Building is on CNS property, but the roadway and access gate are on leased state property.

The Barnwell Environmental and Dosimetry Laboratory (BEDL) contains facilities and equipment for radiological analysis of air, water and soil samples collected as part of the Barnwell site environmental monitoring program. The laboratory also provides company-wide radiological personnel monitoring services, such as whole body counting, bioassay and dosimetry services. The laboratory's professional technical staff performs disposal site engineering design, environmental characterization and site performance studies. Radioactive Material License 287-03 authorizes possession and use of radioactive material in the analytical laboratory.

Table 4.3-1
CNS Barnwell Ancillary Facilities

Number[1]	Name	Location[2]	Use[3]
2	Receiving Warehouse No. 2	SP/RA	CNS/DTK
3	Warehouse No. 3	SP/RA	CNS/DTK
4	Administration Building	CN	CNS/DTK
6	Environmental & Dosimetry Laboratory	CN	CNS
8	Site Building	SP/RA	CNS
10	Health Physics Building	SP/RA	CNS
11	Site Operations Maintenance Building	RA	CNS
13	Cask Preservation Building	RA	CNS/DTK
14	Cask Maintenance Building	RA	CNS/DTK
16	Grounds Maintenance Shop	RA	CNS
19	Drilling Equipment Storage Trailer	RA	CNS
20	Instrument Calibration Shop	CN	CNS/DTK

(1) Building numbers correspond to locations on CNS Drawing B-500-D-300.
(2) The location codes indicate facility is on State Property (SP), CNS Property (CN), disposal site restricted area (RA) or bordering restricted area fence (SP/RA).
(3) The use codes indicate if facility supports CNS disposal activities (CNS) or is shared between CNS and Duratek (CNS/DTK).

The Site Building is the personnel access and egress point for the disposal site restricted area. Security staff controls vehicle and personnel

access to the restricted area at this location. Monitoring equipment is provided for routine self-monitoring to detect personnel or vehicle contamination prior to exiting the site. The Site Building also includes site employee lockers, a break room, a health physics technician room (to support the performance of radiological surveys of waste transport units and office space), and an office for the DHEC on-site inspector. A smear counting system to assist with waste shipment and vehicle arrival surveys has been relocated to this building.

The Health Physics Building provides office space for health physics technicians to perform radiological surveys of waste transport vehicles exiting the site and other routine radiological protection tasks. The building also houses contamination smear counting equipment and meters used for radiological surveys.

The Site Operations Maintenance Building provides facilities for preventive maintenance and repair of equipment used in the daily operations of the disposal site, including a carpenter's shop.

The Cask Preservation Building contains temporary covered parking facilities for trailers and casks and a location for sand blasting equipment. A separate bay is provided for blasting surfaces with abrasives to reduce contamination (such as cask interiors) or to prepare surfaces for painting (such as cask exteriors). This bay is sealed and maintained under negative pressure during operations, with exhausts passing through High Efficiency Particulate Air (HEPA) filters before release.

The Cask Maintenance Building (CMB) is used to prepare casks for offloading (removing rain covers, loosening lid bolts, etc.), decreasing radiation exposure and improving efficiency and safety during offloading. Casks are also prepared here for release from the site.

The Grounds Maintenance Shop, which is attached to the Cask Maintenance Building, provides storage space for disposal site grounds maintenance equipment and supplies.

The Drilling Equipment Storage Trailer contains parts and supplies in support of drilling operations and environmental sampling at the disposal site.

The Instrument Calibration Shop provides space for calibration of health physics equipment. It also houses instrument calibration sources. Radioactive Material License 287-01 authorizes possession and use of radioactive material in the calibration source area.

4.4 Environmental Monitoring Facilities

CNS maintains significant facilities, instrumentation and equipment for environmental monitoring. The program infrastructure is based in the BEDL, where CNS performs radiological analyses of environmental

media. Non-radiological and certain radiological analyses are performed by vendor laboratories. CNS regularly collects water, air, soil and vegetation samples from monitoring well, trench monitor pipe, air sampling and boundary station locations. The BEDL also maintains comprehensive monitoring of direct radiation along the facility's fenceline and other appropriate locations using thermoluminescent dosimeters (TLDs).

CNS maintains a network of approximately 226 groundwater monitoring wells and 151 trench standpipes designed and located to monitor for the migration of radioactive and hazardous materials. Wells are categorized by type as on-site, boundary or off-site. Wells located near trenches and within the restricted area are designated as on-site wells. Wells positioned within the restricted area and around the boundary of the disposal site are referred to as boundary wells. Wells located off restricted property are off-site wells. Monitor wells are positioned to collect groundwater upgradient as well as downgradient of the site burial area. Trench standpipes, which number one or more within most trenches, allow monitoring of any water accumulation in a trench.

A large part of BEDL disposal site support involves site characterization, groundwater and contaminant transport modeling and site performance evaluation. A full complement of equipment is maintained and routinely used to gather data for site performance evaluation as well as for routine geotechnical investigation related to qualifications for new trenches. This equipment includes a drill rig for geologic/geotechnical sample collection and monitoring well installation, a drilling equipment storage trailer (also used for environmental monitoring equipment storage) and assorted drilling support equipment such as pumps, air compressors and cement mixing apparatus.

4.5 Site Equipment

In addition to equipment associated with specific facilities described above, CNS operates and maintains a variety of equipment and vehicles associated with disposal operations at the site. Equipment includes mobile cranes, earth moving and grading equipment, farm tractors and mowers, electrical generators and forklifts. Vehicles include yard tractors, stake bed trucks, light trucks and trailers.

5.0 DISPOSAL FACILITY OPERATIONS

This section presents the scope of disposal operations, describing in detail the elements required to successfully and safely operate a disposal site. In addition to basic disposal operations functions such as waste receipt and burial, site maintenance and trench construction, this section describes critical compliance functions embodied in CNS' comprehensive environmental monitoring, health and safety and radiation protection programs. These programs have enabled the disposal site to set the industry standard in safety and environmental compliance. The activities described in this section form the basis for the allowable costs identified and described in Section 6.0. The work described in Section 5.0

represents functions and tasks developed over the years through lengthy consultation, review and concurrence from CNS regulatory oversight and CNS internal evaluations. Development of these functions and tasks has also included consideration of comments and recommendations made during audits and inspections of the disposal site operations by various organizations including regulatory entities and customers of the disposal site.

5.1 Disposal Trench Design and Construction

5.1.1 Disposal Trench Qualification

Trench areas are qualified for use prior to trench construction. A geotechnical and hydrological trench qualification investigation is performed in the proposed trench area to demonstrate satisfactory soil characteristics and water table conditions, and suitable proposed trench design.

Site conditions (surface drainage, access) and information from existing boreholes are evaluated as the initial phase of field investigation. Additional exploratory boreholes are drilled if available information is insufficient to characterize the geology of the proposed trench area.

Monitoring data from nearby water table wells are used to determine maximum historic water levels in the area. These data are used to establish the maximum trench depth.

CNS combines trench data and evaluations along with the proposed trench design drawing into a trench qualification report, which is submitted to DHEC for review and approval. Construction begins after DHEC approval. CNS and DHEC verify conformance to design by inspections at designated hold-points in accordance with the approved trench construction procedure.

5.1.2 Trench Construction

Disposal trenches are constructed in accordance with a DHEC-approved procedure, the appropriate trench construction detail drawing and the specific proposed trench design drawing. The drawings are approved by DHEC prior to use. The construction process is controlled through a series of documented hold points and inspections. CNS typically uses earthmoving contractors to construct Class A and Class B/C trenches and CNS personnel and equipment to construct slit trenches.

Prior to excavation, a Registered Land Surveyor (RLS) lays out the trench boundaries in accordance with the approved proposed trench drawing. The larger Class A and Class B/C trenches are constructed using a combination of hydraulic excavators, dump trucks, motor graders and tractor scrapers. During construction,

temporary trench ramps are used to provide access to the excavation area. Slit trenches, due to their narrow and steep-walled design are excavated entirely from the top. CNS allows no personnel entry into the slit trench excavation during construction or trench operations. CNS excavates slit trenches using a hydraulic excavator and dump trucks. CNS extends the slit trench, as needed, based on waste receipt projections, thereby minimizing trench exposure to rainfall, runoff and other forms of weathering.

As excavation proceeds in all trench types, the RLS monitors elevations and sloping and establishes trench bottom elevations. Disposal trenches include systems for collection and removal of water entering the closed trench.

CNS conducts formal and informal inspections throughout the construction process and DHEC performs three formal inspections. Formal DHEC inspections occur after (1) trench excavation, (2) drain construction and (3) final floor sand installation. After final trench approval, CNS prepares an as-built trench drawing and documentation package. Pertinent documents are maintained as permanent trench construction records.

5.1.3 Completed Trench Activities

CNS' license and procedures require several activities after completion of burial operations in a trench. These activities include (1) final grading of initial cap and installation of temporary trench identification markers, (2) health physics surveys, (3) enhanced cap construction and (4) installation of standpipe protection pads and permanent markers.

5.1.3.1 Initial Clay Cap

During waste disposal operations, CNS backfills trenches with free-flowing soil around disposal vaults and places an initial clay cap above the topmost vaults in a trench. The initial cap is compacted in lifts and graded to drain surface water away from the trench. After burial operations in a trench are complete, the RLS confirms initial cap grade is consistent with the proposed trench drawings, and CNS performs final grading, as required.

CNS installs temporary trench identification and corner markers. The temporary markers are removed and replaced with permanent features during enhanced cap construction.

5.1.3.2 Health Physics Surveys

The CNS Health Physics department performs a completed trench survey, measuring direct gamma above the initial clay cap. These measurements are to ensure the backfill and initial cap provide adequate shielding for waste.

5.1.3.3 Enhanced Cap Construction

As soon as practicable following completion of waste disposal and backfilling of a trench, CNS constructs multi-layer enhanced caps in accordance with a DHEC-approved design report and work plan . Often final capping is delayed until CNS completes a reasonable area of adjacent trenches. CNS manages several contractors and consultants to perform the specialized construction work required for installation of engineered caps.

5.1.3.4 Standpipe and Permanent Marker Installation

Following completion of enhanced capping, CNS installs protective pads around standpipes and permanent identification and corner markers.

5.2 Waste Disposal Operations

5.2.1 Receipt and Inspection of Waste

Certain prerequisites must be satisfied prior to the acceptance of any waste for disposal. Those prerequisites include:

- prior notification of waste shipments by shippers,
- review of shipment documentation upon arrival of the shipment at the disposal facility,
- inspection of the shipment for compliance with U.S. Department of Transportation regulations,
- radiological survey of the vehicle and accessible packages and
- verification of waste class and waste form.

If a discrepancy is noted during the receipt inspection of the waste shipment or its paperwork, the CNS Licensing Department is notified. The CNS Licensing Department notifies the shipper and the DHEC on-site inspector of the discrepancy. A Condition Report is generated and the shipment may not be accepted for disposal until appropriate corrective actions are taken and approval is granted.

5.2.1.1 Prior Notification Process

At least 72 hours prior to releasing a shipment for delivery to the disposal site, the shipper must notify the CNS Prior Notification Plan (PNP) Department with information concerning the shipment. This information includes name of shipper, anticipated arrival date and detailed information on the waste.

CNS reviews the information and verifies that the shipper has a valid permit to transport waste into or within the state of South Carolina. The detailed waste information is entered into an electronic database (the Waste Manifest Data Management System). The shipper is issued a shipment identification number once the information is entered into the Waste Manifest Data Management System.

5.2.1.2 Review of Shipping Documentation

When waste shipments arrive at the disposal site, the Licensing Department reviews the paperwork to verify compliance with U.S. DOT regulations, Barnwell Site Criteria and the 097 License. This paperwork includes:

- The Barnwell Waste Management Facility Uniform Low-Level Waste Manifest,
- S.C. DHEC Radioactive Waste Shipment Prior Notification and Manifest Form (DHEC 802 Form),
- S.C. DHEC Radioactive Waste Shipment Certification Form (DHEC 803 Form),
- Complete isotopic analysis printout or equivalent for aqueous filter media, filters and resins,
- Documentation of waste classification methods and approval required for Class "C" waste shipment,
- Written statement of any unusual hazards and/or precautions that must be taken,
- High Integrity Container Certification, and
- A DOE/NRC Form 741 for Special Nuclear Material (SNM) when required.

Data from the appropriate documents are entered into the Waste Manifest Data Management System. The resultant calculated package volumes, activities and weights are verified with the reported values from the manifest for consistency. The waste generator and/or shipper is responsible for properly classifying the waste and documenting it on the manifest. Using the information provided in the shipping documentation, CNS

calculates the waste classification. When the documentation is found to be acceptable, a "traveler" form is generated that accompanies the shipment through the remaining inspections and offload.

5.2.1.3 Health Physics Receipt Inspection

Once the paperwork has been accepted, the Health Physics Department performs a visual and radiological inspection of the shipment. The visual inspection includes checking that the packages are:

- properly braced and blocked,
- properly labeled and marked,
- not damaged, and
- properly palletized, if appropriate.

The transport vehicle is also inspected to verify that it is properly placarded. Direct radiation and surface contamination surveys of the vehicle and packages are performed to verify compliance with the U.S. DOT radiological limits.

When all incoming inspections are satisfactorily completed, CNS provides the shipment paperwork to the on-site DHEC inspector for review. When the DHEC inspection is complete, CNS proceeds with the offload of the shipment.

5.2.2 Waste Handling and Storage

Depending on the type of shipment and waste type, the transport vehicle will be directed to either the Cask Maintenance Building (CMB) or other appropriate location within the restricted area.

5.2.2.1 Cask Unloading

Casks are directed to the CMB where the casks are prepared for offloading. Quality Control (QC) inspections are performed on the cask at the CMB. QC inspections include checking the integrity of cask chains and cables, hold-down assembly, rain cover, cask bolts and ratchets, etc. Health Physics personnel perform additional radiological surveys on the cask to assist in preparing for offloading. Offload preparations include removal of the rain cover or impact limiter, loosening ratchet binder assemblies and removal of lid hold-down bolts.

Once all inspections and offload preparations are complete, the cask is then directed to the appropriate

trench for offloading. Cask shipments are directed to the appropriate trench depending on waste classification and/or container dose rates. At the appropriate trench, containers are unloaded into concrete disposal vaults.

5.2.2.2 Van Unloading

Closed vans are directed to the CMB to complete arrival radiation surveys on the top of the van. Following these surveys the van is moved to the appropriate trench. Containers are unloaded using the appropriate equipment into either the rectangular or cylindrical disposal vaults.

5.2.2.3 Container Inspections

CNS continues inspecting containers as they are unloaded and placed in the disposal vaults. The CNS Licensing Department is notified if any container is damaged, or is improperly marked or labeled.

Containers are selected according to CNS procedure or at DHEC request for verification of the absence of freestanding liquid criteria. Liners may be placed in a test stand and punctured using hydraulic rams and special punches. Low dose drums and boxes may be placed in an appropriately controlled area and punctured using hand tools. Liquids found are collected and measured. If the amount of measured liquid exceeds the criteria, the on-site DHEC inspector and the generator are notified and proper disposition of the container is determined.

5.2.2.4 Large Component Handling

Large components such as steam generators and pressurizers are disposed of intact. Evaluations qualifying the large components as disposal vaults eliminating the need for concrete vaults are submitted to DHEC for review and approval. Because of their size and weight, large components are brought onto the trench floor with specially designed transport equipment and hardware.

5.2.3 Waste Disposal

Disposal containers are unloaded from vans and casks and placed inside disposal vaults. Three types of reinforced concrete vaults are normally used: slit trench, rectangular and cylindrical vaults. In some cases, oversized waste containers may require a custom-size vault that will require additional DHEC approval. The position of each vault is recorded in the Waste Manifest Data Management

System. Since large components are qualified as disposal vaults, they are placed directly in the trench. For each large component, CNS develops a trench placement plan that is reviewed and approved by DHEC prior to acceptance of any large component for disposal. Monthly disposal volume reports are prepared and submitted to DHEC.

5.2.4 Disposal Trench Stabilization and Closure

When the vaults are filled and closed, CNS places free-flowing backfill material in the void space between the vaults. Filling void space minimizes the potential for subsidence of the enhanced cap.

Following backfill, vaults are covered with additional soil material and clay cap. CNS installs the initial clay cap to minimize the infiltration of surface water into the trench. Grass may be planted on the initial cap to control erosion. CNS installs the final multi-layer enhanced cap after completion of waste disposal in a trench.

5.3 Site Maintenance

As required by License 097, CNS implements a comprehensive site inspection and maintenance program to ensure trench cap integrity and to maintain proper surface water drainage. All completed trenches are inspected monthly and after substantial rainfall. General disposal site inspections occur weekly. The inspections identify concerns such as erosion, settlement, and water ponding on or around trench areas and ensure timely repair.

CNS maintains records of inspections and maintenance actions. These records document disposal area performance and provide data for estimating future trench maintenance requirements.

CNS also performs operational maintenance activities. The areas around the active trenches are graded to ensure proper drainage of precipitation away from the open portions of the trenches. On-site parking areas, trench work areas and access roads to the active trenches are graded and maintained.

License 097 requires that storm water accumulation in trenches is kept away from waste. CNS manages storm water accumulated in active trenches through evaporation and percolation in available space within open trenches. CNS maintains emergency back-up storage capacity in a lined holding pond.

CNS manages surface water in accordance with the requirements of License 097 and State NPDES regulations. The primary requirements of License 097 are to eliminate run-in of surface water into open trenches, efficiently drain rainwater off of closed trench caps to minimize potential infiltration and contour trench covers to minimize erosion. These

considerations are addressed in the facility's trench construction procedure and in the design of multi-layer caps, all of which are approved by DHEC before implementation. NPDES requirements are implemented through a Storm Water Pollution Prevention Plan (SWPPP). The purpose of the SWPPP is to establish measures to minimize the release of pollutants (including sediment) from the disposal site in storm water.

5.4 Radiation Protection Program

An integral part of the overall Health and Safety Program is the radiation protection program. This program is designed to ensure site workers, other CNS employees, visitors and members of the general public are not exposed to ionizing radiation in excess of the limits established by DHEC. CNS manages this program with the philosophy that exposures to ionizing radiation should be maintained As Low As Reasonably Achievable (ALARA). CNS maintains an ALARA subcommittee to help achieve this philosophy and draws on expertise throughout the company to provide expert reviews and advice for the radiation protection of workers. Routine and special meetings are held to discuss dose goals and engineering controls to further reduce employee exposure.

The radiation protection program controls external exposures to ionizing radiation in accordance with DHEC requirements. Exposures are measured using personnel monitoring and other appropriate dosimetry. Radiation work permits are generated as a controlling device for certain work activities with potential radiation exposure. The permits detail the personnel protective equipment required for the activity and any other special considerations needed to safely perform and control the work.

CNS controls exposure to internal sources of radiation to limits substantially below DHEC requirements. CNS uses bioassay samples and whole body radiation scans to monitor internal radiation exposures. If it is determined that an internal exposure has occurred, an internal dose assessment will be performed as part of the total effective dose equivalent record. Controlling internal exposure is done through the respiratory protection program and in accordance with criteria specified in specific radiation work permits.

A key element in the management of radiation program controls is the establishment of areas of different degrees of hazard or potential hazard. Clean areas, which are considered free of radioactive material hazard, are routinely monitored to ensure these areas remain clean. Whereas restricted areas, which may pose a greater potential hazard, require additional monitoring or a higher level of control. Special control areas (such as radiation, airborne radioactivity, controlled surface contamination, and radioactive material storage areas) are designated in accordance with regulations to manage radiation risk. Additional training requirements have been established for personnel entering these areas.

The radiation protection program establishes radiological controls to

manage external exposure to alpha, beta and gamma radiation. These controls also are used to minimize the inhalation and ingestion of radiological materials. Through radiological dose rate and contamination surveys, the proper controls can be determined. Adequate personnel contamination monitoring is provided through these surveys and radiological airborne contamination monitoring.

To properly administer the program, radiological controls personnel must undergo rigorous training in areas such as regulatory requirements, radiation protection implementation, health physics principles and practices, proper documentation through surveys, radiation work permits, sample logs and airborne monitoring.

To ensure proper radiation monitoring, CNS personnel maintain, repair and calibrate instrumentation. The equipment is traceable to the National Institute of Standards and Technology. The program also controls the calibration and check source inventory.

5.5 Environmental Monitoring

As required by License 097, CNS maintains both radiological and non-radiological comprehensive environmental monitoring programs for the disposal site. These programs are designed to assure that any releases of waste materials can be readily detected during operation of the site or following closure. The radiological monitoring program objectives incorporate International Commission on Radiological Protection (ICRP) guidelines.

5.5.1 Radiological Environmental Monitoring Program

The radiological environmental monitoring program for the disposal site is multifaceted, involving a wide range of techniques and sample points. CNS monitors the atmosphere, soil, vegetation, surface water, sediment and groundwater. In addition, instruments are carefully located to check direct radiation from the site. The sample collection schedules for the on- and off-site areas including number of each sample type, frequency of sampling and analyses performed are shown in Table 5.5.1-1. The monitoring results are submitted to DHEC on a quarterly basis in the form of two reports, the CNS Site Operational Monitoring Report and the CNS Environmental Monitoring Report. Components of the monitoring program are discussed briefly in the sections that follow.

Atmospheric Monitoring

CNS implements atmospheric monitoring around the perimeter of the disposal facility as well as around active disposal areas. Atmospheric monitoring is concentrated close to active disposal areas in order to increase the likelihood of detecting any potential release soon after it occurs. A particulate filter sample is taken at

the side of active trenches near the edge of the wall where the waste is being buried. This air particulate monitor is positioned downwind and moved whenever there is a shift in wind direction. Additional air sampling is performed on an as-needed basis.

Continuous air samples are taken at permanently located stations around the perimeter of the site. The disposal site's boundary stations are located uniformly around the site following ICRP guidance. Uniform spacing enables CNS to distinguish between radioactive materials potentially released by adjacent facilities and the Barnwell disposal site. This approach ensures that all sectors are adequately monitored and all precautions are taken to measure releases from other facilities. Particulates are collected by drawing air through a glass-fiber filter. The filters which contain the sampled particulates, are exchanged bi-weekly.

Soil and Vegetation

Surface soil samples are taken to detect deposition and early infiltration of radioactive material into the soil. Characteristically, tritium and other soluble species have the potential to move through the top layer of the soil rapidly. Surface soil samples provide detection of early or on-going deposition of such radionuclides. Insoluble species, which move much more slowly and are not readily distributed in soil, tend to remain near-surface. In this case, samples help demonstrate if airborne radioactive material has been deposited as a result of routine site operation. Likewise, samples of vegetation may also indicate whether radioactive materials are being deposited.

Surface Water and Sediments

Surface water and sediments are collected at the disposal site. Particular attention is given to surface waters outside the site boundary that could be used as drinking water by the public or animals. Downgradient of the disposal site, CNS has located and monitors the location where shallow groundwater flowing under the site first emerges to join surface streams. At the disposal site, shallow groundwater discharges at the headwaters of Mary's Branch. Water and sediments are monitored at this location, as well as at other nearby stream locations.

Groundwater

The most important facet of any environmental monitoring program for a low-level radioactive waste site is groundwater. CNS routinely monitors an extensive network of both on- and off-site wells for radioactive materials. On-site wells monitor groundwater near trench locations and at the site boundary. Off-site wells are located both up-and down-gradient from the site to as much as three miles

away. Wells are strategically positioned in all directions to permit analysis of groundwater upgradient as well as downgradient of the site.

Thermoluminescent Dosimeters

Each environmental station is equipped with a set of thermoluminescent dosimeters (TLDs) to measure external exposure from penetrating gamma radiation. TLDs are also located at intervals along the perimeter fence of the site. CNS makes extensive use of TLDs because such monitoring is relatively inexpensive and yet highly reliable for demonstrating compliance with radiological standards.

Table 5.5.1-1

Barnwell Site Monitoring Program Sample Collection Schedule

Sample Description	# of Loc[1]	Type	Media	Frequency	Analysis
On-Site Locations:					
Monitor Wells[2]	106	Grab	Water	Quarterly	Gross Alpha/Beta, Gamma Isotopic, Tritium, C-14[4], pH, Conductivity, Temperature
Observation Sumps[2]	151	Grab	Water	Quarterly	Gamma Isotopic & Tritium
External Gamma	32	Continuous	TLD	Quarterly	Exposure
Site Boundary Locations:					
Wells[2]	28	Grab	Water	Quarterly	Gross Alpha/Beta, Gamma Isotopic, Tritium, C-14[5], pH, Conductivity, Temperature
Soil	11	Grab	Soil	Annually	Gamma Isotopic, Tritium
Vegetation	11	Grab	Vegetation	Annually	Gamma Isotopic, Tritium
Atmospheric	11	Continuous	Particulate Filter	Bi-Weekly	Gross Alpha/Beta, Gamma Isotopic
External Gamma	64	Continuous	TLD	Quarterly	Exposure
Off-Site Locations:					
Potable Wells[3]	9	Grab	Water	Annually	Gross Alpha/Beta, Gamma Isotopic, Tritium, pH, Conductivity, Temperature
Monitor Wells[2,3]	83	Grab	Water	Quarterly	Gross Alpha/Beta, Gamma Isotopic, Tritium, C-14[6], pH, Conductivity, Temperature
Surface Water[8]	8	Grab	Water	Quarterly	Gross Alpha/Beta, Gamma Isotopic, Tritium, C-14[7], pH, Conductivity, Temperature
Soil[8, 9]	5	Grab	Soil	Annually	Gamma Isotopic, Tritium
Vegetation[8,9]	5	Grab	Vegetation	Annually	Gamma Isotopic, Tritium
Sediment[8]	4	Grab	Sediment	Annually	Gamma Isotopic, Tritium
Atmospheric[9]	1	Continuous	Particulate Filter	Bi-Weekly	Gross Alpha/Beta, Gamma Isotopic
External Gamma	10	Continuous	TLD	Quarterly	Exposure

[1] As of June 27, 2005

[2] Water levels measured quarterly

[3] Selected wells sampled quarterly

[4] At 15 wells annually, Gross-Alpha Beta is used as a surrogate for C-14

[5] At 3 wells annually, Gross-Alpha Beta is used as a surrogate for C-14

[6] At 10 wells annually, Gross-Alpha Beta is used as a surrogate for C-14

[7] At 2 locations annually, Gross-Alpha Beta is used as a surrogate for C-14

[8] Off-Site Springs and Creeks

[9] Barnwell County Airport

5.5.2 Non-Radiological Monitoring Program

CNS initiated a non-radiological groundwater monitoring program in the third quarter of 1986. The program is designed to characterize and monitor non-radiological constituents in the groundwater at the disposal site. Since 1986, the monitoring program has been enhanced by changing the selection of monitoring wells and non-radiological parameters.

The non-radiological groundwater monitoring program consists of fifteen on-site wells, three boundary wells, ten off-site wells, and two creek sample points. On a quarterly basis, twenty-one of these thirty sample locations are sampled and analyzed for pH, conductivity, total organic carbon, and volatile organics. The remaining twelve wells are sampled and analyzed for pH, conductivity, total organic carbon, and chloroform. Additionally, on an annual basis, twenty-one downgradient sample points are sampled for a complete list of EPA Priority Pollutants. These priority analytes include metals, acids, base/neutrals, pesticides/PCB's, total phenols and total cyanide.

Each quarter, three blind duplicates (ten percent of the total samples) are collected and analyzed for the complete parameter list. These duplicates are selected each quarter and vary from quarter to quarter. The duplicates are used to provide a measure of laboratory quality. Trip and field blanks are also collected for each day of sampling. These blanks are analyzed for volatile organics, and a volatile organic library search is also performed. Blanks provide a measure of quality assurance for both sample collection methods and laboratory analyses.

Samples are collected by CNS and provided to an independent laboratory for analysis. Upon receipt of the laboratory results, CNS performs a review of the data and forwards the results to DHEC. A summary of the sample schedule is provided in Table 5.5.2-1.

Table 5.5.2-1
Barnwell Site Non-Radiological Groundwater Sample Schedule

Sample Description	# of Locations	Type	Media	Collection Frequency	Analysis
Wells	16	Grab	Groundwater	Quarterly	pH, Conductivity, Total Organic Carbon, Volatile Organics, Library Search
Stream	2	Grab	Surface water	Quarterly	pH, Conductivity, Total Organic Carbon, Volatile Organics, Library Search
Wells	12	Grab	Groundwater	Quarterly	pH, Conductivity, Total Organic Carbon, Chloroform

Table 5.5.2-1

Barnwell Site Non-Radiological Groundwater Sample Schedule

Sample Description	# of Locations	Type	Media	Collection Frequency	Analysis
Wells	16	Grab	Groundwater	Annually	pH, Conductivity, Total Organic Carbon, Volatile Organics, Library Search, Acids, Base/Neutrals, Pesticides/PCB's, Cyanide, Phenols, Carbon-14
Stream	2	Grab	Surface water	Annually	pH, Conductivity, Total Organic Carbon, Volatile Organics, Library Search, Acids, Base/Neutrals, Pesticides/PCB's, Cyanide, Phenols, Carbon-14
Wells	12	Grab	Groundwater	Annually	pH, Conductivity, Total Organic Carbon, Volatile Organics, Library Search

5.6 Quality Assurance Program

Chem-Nuclear operates in accordance with the Duratek Quality Assurance Program. The Quality Assurance Program is comprised of planned and systematic actions that are necessary to assure that CNS disposal and disposal-related activities are conducted in a satisfactory and compliant manner. The controls of the QA Program address disposal and disposal-related activities that are considered "Important to Safety". "Important to Safety" items and activities are those necessary to assure that radioactive waste is received, handled, packaged, stored, processed or disposed without undue risk to the health and safety of the public or the environment. The Quality Assurance Program is based on the nuclear industry standards and regulations required by our customers, the U.S. Nuclear Regulatory Commission and DHEC.

The QA Program is implemented through a series of procedures, instructions and drawings that are prepared, reviewed and approved by appropriately qualified personnel. Adherence to the QA Program and implementing procedures, instructions and drawings is mandatory for all CNS employees and subcontractors. Key elements of the QA Program include, but are not limited to:

- Training and qualification of personnel
- Controls for purchased materials, items and services
- Document control
- Inspections
- Audits
- Record keeping

The QA Program requires CNS personnel that perform "Important to Safety" activities to receive training on the purpose, scope and implementation of procedures and instructions. The personnel also

receive training in the principles and techniques of the activity being performed. The QA Program requires that this training be documented.

An important element of the QA Program is the Safety Review Board. The Safety Review Board (SRB) is responsible for review and oversight of the conduct of CNS business where matters of safety are involved and to assure compliance with applicable regulatory requirements, procedures, policy, licenses, permits and certificates. SRB members are selected based on their experience and level of responsibility within the company. The SRB normally meets once a month and conducts additional SRB meetings as required for review and approval of new procedures. The SRB is supported by four subcommittees that report to the SRB on matters related to ALARA, Brokering, Emergency Response and Environmental Health and Safety.

The documents that are used to implement the QA Program are controlled by the Company's Document Control Center. These documents are controlled and distributed using a controlled distribution list. Procedures require that personnel remove any obsolete documents from the workplace. The Document Control system ensures that personnel have available the appropriate procedure, instruction or drawing and that it is the most current revision.

Materials, items and services purchased for the disposal site are controlled through a number of QA Program procedures. First, vendors who supply the disposal site with Important to Safety material, items and services must be evaluated and approved by Quality Assurance. Secondly, the material and items are receipt inspected by a qualified Quality Control Inspector prior to being placed in service. These actions ensure that materials, items and services comply with the applicable design, quality and regulatory requirements.

The CNS Quality Assurance/Quality Control Department is responsible for verifying compliance to the QA Program and implementing procedures. The verification activities include a series of inspections, surveillances and audits of the activities performed at the Disposal Site. Formal internal audits of all of the functional areas covered by the QA Program are conducted at least once per year. The results of these inspections, surveillances and audits are reported to senior management for evaluation and development of corrective action.

Any deficiencies identified are entered into the CNS Corrective Action Program. This Program requires that each deficiency is evaluated for cause and appropriate corrective actions are developed to fix and prevent recurrence of the deficiency. Corrective action plans are reviewed and approved by the Quality Assurance Department. Further, the Quality Assurance Department verifies effective completion of corrective actions prior to closing the issue.

The records system maintained by CNS includes the retention of those records essential to demonstrate quality and compliance to requirements. Records are prepared, reviewed, approved and maintained in accordance with established procedures and are readily retrievable. The records are retained in a secure and controlled environment.

5.7 Training and Emergency Response Program

5.7.1 Training Program

CNS provides training to its employees and contract personnel to effectively and safely perform the duties of their position.

All personnel are required to take the General Employee Training (GET). The GET is designed to provide employees and contract personnel with the basics of safety, security, quality and radiation protection fundamentals. The fundamental information is necessary to better understand the requirements of the individual's job, safety requirements and the various regulations under which CNS operates.

In addition to GET, individualized training is provided to each employee and contract personnel based on their job responsibilities. The individual's supervisor is responsible for identifying the training requirements. The individualized training may include the following training topics:

- Radiation Worker Training
- Transportation Training
- Heavy Equipment Operator Training
- Hazardous Materials Training
- Emergency Response Training

5.7.2 Emergency Response Program

The Emergency Response Program provides the guidelines for emergency preparedness to ensure that the:

- Disposal site is operated to limit radiation exposure and the release of radioactive materials in an emergency;
- capability exists for measuring and assessing the significance of an accidental release of radioactive materials;
- capability exists for responding to nonradiological emergencies (e.g., fires and chemical spills);
- appropriate emergency equipment, procedures and training are provided;
- notifications are promptly made to appropriate state and local agencies; and

- necessary recovery actions are taken to return the disposal site to a safe condition after an emergency.

A Facility Emergency Response Team is comprised of individuals with experience and training in responding to radiological incidents, non-radiological incidents and medical emergencies. These individuals undergo initial and annual training. When requested, CNS also provides training to local fire, medical and law enforcement personnel covering radiological protection during incidents. The training includes a tour of the facility and identification of areas of special precautions.

Annual emergency response exercises are conducted to maintain readiness. The exercises are critiqued and corrective actions are taken to improve the program.

5.8 Environmental Health and Safety

The Environmental, Health and Safety (EH&S) Program defines the environmental, health and safety requirements and designated protocols to be followed by CNS employees at the disposal site. The CNS health and safety program is established through a series of safety procedures which include the applicable requirements of the Occupational Safety and Health Administration (OSHA) regulations. The program applies to all CNS employees as well as CNS subcontractors and visitors to the site. The program provides guidance for field monitoring, sample collection and data analysis, and engineering and administrative controls. As part of this program, CNS personnel monitor and plan for chemical and biological hazards, physical hazards (such as confined spaces), vibration and noise hazards and other environmental hazards.

EH&S personnel also evaluate effectiveness of the CNS personnel protective equipment program, administer the industrial hygiene air monitoring program and provide oversight for environmental compliance in the area of hazardous and non-hazardous waste management.

The Environment, Health and Safety Subcommittee of the Safety Review Board is an integral part of the program incorporating individuals from different disciplines in evaluations of program effectiveness (including periodic inspections) throughout the facility.

5.9 Physical Security

This section describes the physical security system for the disposal site. Objectives of the program are to:

- Maintain access control by monitoring the entrance and departure of authorized persons;
- Provide means for responding to emergency situations;

- Protect facility personnel and equipment;
- Detect unauthorized entries; and
- Provide means for responding to unauthorized entries.

The security system maintains surveillance 24 hours a day, 7 days a week. Personnel are stationed at site entry and exit locations.

The restricted area of the site is bounded by a six-foot high fence. Vehicle access gates at the Site and Administration buildings are motor-operated and controlled from a security monitoring station at each building location. All other site access gates are locked and manually-operated, with keys maintained by security. Both "No Trespassing" and "Radioactive Materials" signs are installed and maintained along the perimeter of the restricted area fence.

CNS security also controls unrestricted areas. The unrestricted areas that require security measures include CNS-controlled property that is part of the facility but located outside the radiological control area. These include disposal site support facilities, off-site environmental monitoring locations and other adjacent CNS properties.

Security personnel perform routine physical facility inspections. During non-operational hours, the guard on duty ensures that administrative areas, gates and buildings are secure and verifies that the alarm systems are operational.

A security guard at the entrance to the facility restricted area ensures that people entering the restricted area are properly badged. Security guards control sign in/out logs and maintain active surveillance of the facility. Before entering or exiting the restricted area, vehicles may be inspected by security personnel for prohibited items.

Security guards are responsible for controlling and issuing keys and locks to facility personnel. They are also responsible for issuing to authorized employees permanent identification badges which must be worn on-site. Individuals with authorized access but not having a permanent badge (i.e., visitors, vendors, contractors) must obtain a visitor badge from the security guard. The security guard on duty verifies the names of the people issued badges and the types of badges issued. In addition, the security guard confirms the current standing of permanently-issued badges.

5.10 Community Education and Communication

For over 30 years, CNS has maintained an "open door" policy with respect to visitors to the disposal site as well as open and active lines of communication with community leaders, residents and organizations. These lines of communication serve to support education of the public in matters related to LLRW disposal and have kept information about the disposal site and its operation accessible to the public. Continuation of an

open, public LLRW disposal process, maintenance of effective lines of communication and education of the public will remain integral elements in the future successful operation of the disposal site.

5.11 Organization Structure

CNS is a subsidiary of Duratek, Inc. (Duratek). The mission and focus of the CNS organization is operation of the regional LLRW disposal site located in Barnwell County, SC. This section defines key elements of the CNS organizational structure, discusses direct costs associated with the CNS organization and identifies indirect costs allocated to the disposal organization from other parts of the parent company. A basic organization/function chart for CNS is provided as Figure 5.11-1. Functional teams are described in the following sections.

5.11.1 Disposal Operations Team

This team includes personnel and costs directly involved in waste handling operations and site construction/earthworks activities at the disposal site. Included in this team are the Site Operations Coordinator and the Site Construction Coordinator. Also included are Radwaste Technicians, Cask Operating Technicians, Crane Operators, Equipment Operators, Maintenance Mechanics and Waste Tracking Database staff.

5.11.2 Commission/Compact Liaison Team

This team includes personnel and costs associated with required interfaces with the SC Public Service Commission, the SC Budget and Control Board and the Atlantic Compact Commission. It also includes liaison and interaction with generators of LLRW to manage annual disposal volumes in accordance with the legislated annual volume limits. Activities associated with education of members of the public on matters relative to LLRW disposal and liaison with local elected officials relative to disposal site operations are also included here.

5.11.3 Disposal Administration Team

This team includes management, supervision, training support and security guards for the disposal site. It also includes finance, accounting, billing and accounts payable support for waste disposal operations.

5.11.4 CNS Regulatory Affairs and Licensing Team

This team includes costs associated with review and renewal of the disposal license and disposal related permits; pre-approval of waste shipments through the Prior Notification Process; review of shipping paperwork to verify compliance with US DOT

regulations, Barnwell Site Criteria and License 097; and document control. Included here are Licensing and Regulatory Affairs management and Barnwell licensing support.

5.11.5 Barnwell Health Physics Team

This team includes the Radiation Safety Officer for the disposal site, a Health Physics Manager and Health Physics Technicians to support waste receipt and disposal operations and instrument calibration.

5.11.6 Barnwell Support Services Team

This team forms a pool of costs allocated as indirect costs to business units with significant activities located in the Barnwell Area. This allocation is divided between Disposal and other Duratek business units based on approximate head counts. Included in this team are Barnwell area Human Resources personnel, and costs such as utilities, janitorial services, telefax, postage and trash pick up and county landfill charges.

5.11.7 Safety

This team is a pool of costs for personnel and supplies related to safety for activities in the Barnwell area. The safety and loss control manager function is included in this unit. Costs from this team are allocated to Disposal and other Duratek business units based on approximate head counts.

5.11.8 Quality Assurance/Quality Control

This team provides quality assurance program support and direct quality control support required for disposal operations.

5.11.9 Barnwell Environmental and Dosimetry Lab

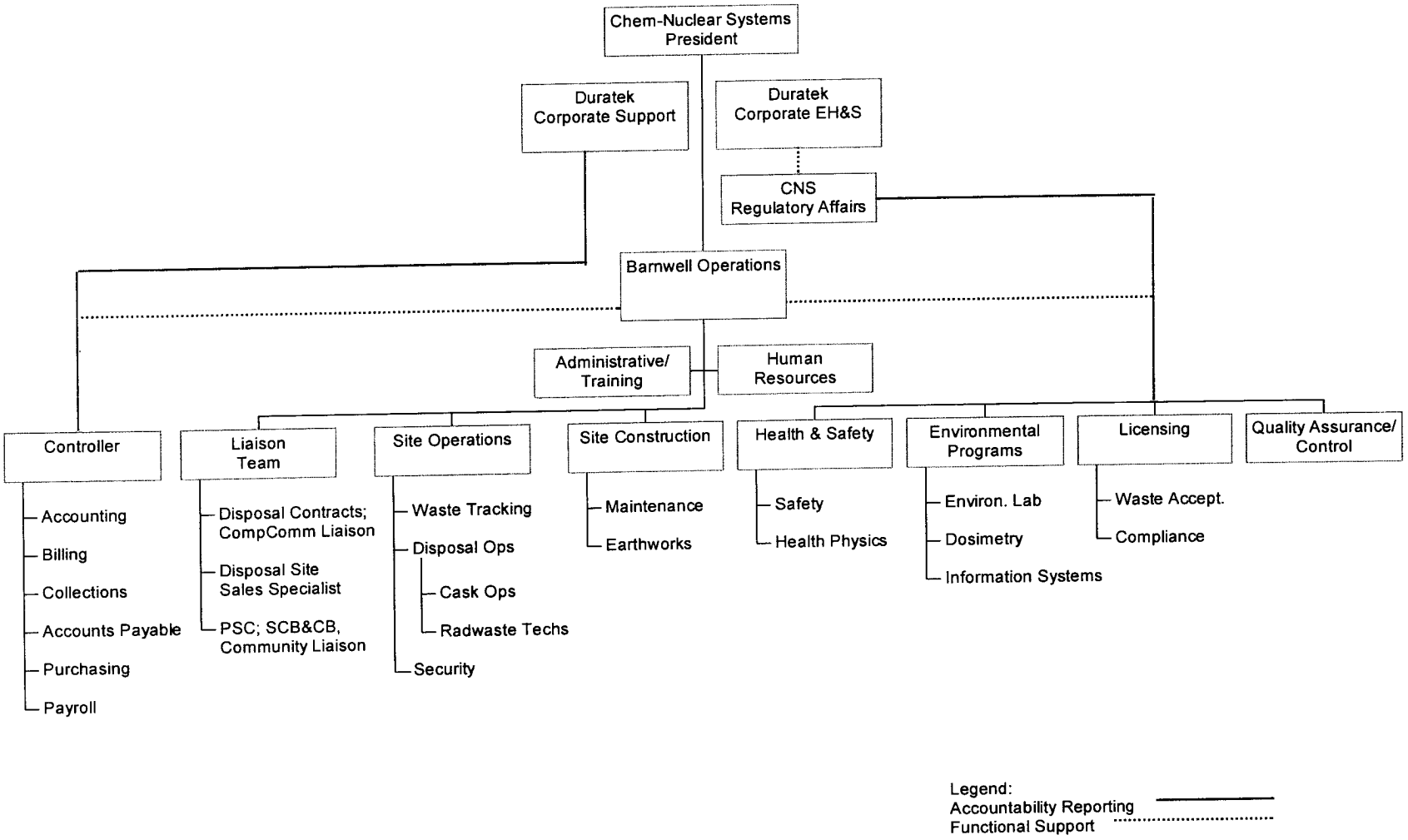
The Barnwell Environmental and Dosimetry Lab (BEDL) primarily supports the disposal site. Labor, material and other costs are captured in this unit or charged to appropriate projects. The BEDL conducts environmental monitoring, characterization and groundwater modeling studies and engineering design for the disposal facility. Records of environmental and regulatory compliance are maintained by the BEDL in electronic databases. The BEDL also maintains dosimetry records for the disposal site, field services and other business unit personnel. The cost for dosimetry records, data processing and reports for other units are transferred to those units through a project number. The BEDL also supports Barnwell Complex wide Information Systems. Information

Systems support costs are allocated between Disposal Site and other business units.

5.11.10 Parent Company Indirect Costs

Disposal operations receives various kinds of administrative support from parent company business units. This support typically includes services such as general ledger maintenance, fixed asset depreciation accounting, purchasing and receiving warehouse support, accounts receivable collections, legal counsel support, Environmental, Health and Safety support and quality assurance oversight. Costs for these services and support are collected in appropriate "pools" and allocated to lines of business throughout the company using appropriate allocation methods.

Figure 5.11-1
Disposal Operations Functional Organizational Chart



5.11.11 CNS Charges to Other Units

Some personnel assigned to the CNS organizational structure may occasionally charge labor costs to other projects or business units within the parent company organization. These costs will be charged based on the employee's hourly rate plus fringe.

5.12 Collaborative Review

In 2002, CNS retained Project Time & Cost, Inc. (PT&C) to develop an independent Operations and Efficiency Plan (O&E Plan) for the CNS Barnwell Disposal Facility. The plan was delivered to CNS on May 31, 2002, and provided by CNS to the Commission on June 26, 2002. On April 14, 2003, the Commission issued Order No. 2003-188. This Order directed CNS to file a statement regarding a collaborative review of the O&E Plan. In response to the order, participants from the following organizations met several times:

S.C. Public Service Commission
S.C. Department of Health & Environmental Control
S.C. Budget & Control Board
Atlantic Compact Commission
S.C. Consumer Advocate
Chem-Nuclear Systems

The parties, after completing a collaborative review of the O&E Plan, reached consensus that the information provided in the O&E Plan is a valid representation of disposal site operations and that the plan can be used as a baseline for establishing a method for determining allowable costs in future Commission proceedings. The parties identified three cost categories (variable costs, fixed costs and irregular costs) for operating the Barnwell disposal site. The parties also reached consensus on recommendations provided for the Commission's consideration.

The SC B&CB's consultant, URS, reviewed the Work Breakdown Structure (WBS) and estimates prepared by PT&C as part of the O&E Plan. URS submitted spreadsheets that compared its cost and time estimates with those prepared by PT&C. Review of the information, followed by discussion among the parties, formed the basis for identification of cost categories, which were then narrowed to the final three. Once each work activity was categorized, a review of the time estimates and the resulting dollars ensued, with particular emphasis on those activities where the differences were considerable.

URS visited the Barnwell disposal site to review how employees perform certain activities. Using data gathered at that visit, URS prepared another spreadsheet for a subsequent meeting between the parties. This meeting included a collaborative review of those items upon which the parties had not yet reached consensus and a review of a draft consensus report

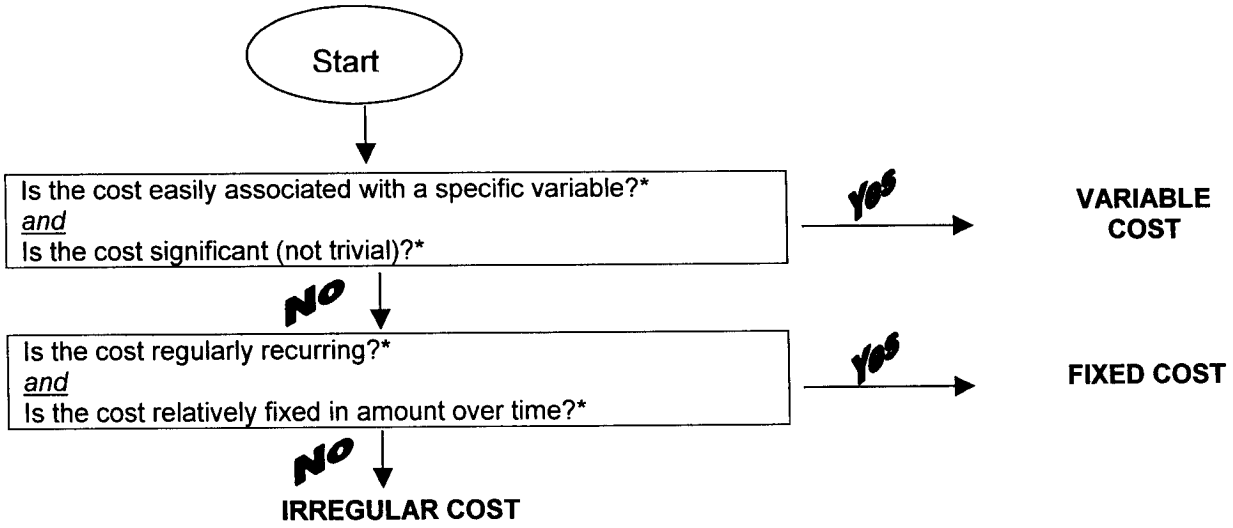
outline. A final review meeting was held and consensus was obtained. The Report of the Collaborative Review was submitted to the Public Service Commission on June 16, 2003.

5.12.1 Cost Categories

A spreadsheet of Barnwell disposal site estimated costs was developed to tabulate the estimate. Each activity was identified by WBS element, and included associated cost type, expense category and dollar estimates.

The O&E Plan identified seven cost types, some of which are facility-specific and some could be seen as overlapping from one category to another. Through the collaborative review discussions, the participants determined that three generic cost types represent all the WBS elements. A working definition in Figure 5.12-1 was developed and used to classify each of the costs as variable, fixed or irregular. Fixed costs are regularly recurring and relatively constant over time. Variable costs are readily associated with a specific variable and change as the variable changes. Irregular costs occur on an intermittent basis and cannot be easily associated with a specific variable.

FIGURE 5.12-1
WORKING DEFINITIONS FOR PURPOSES OF COST CLASSIFICATION



*The two questions in each box establish qualitative tests and should be considered together. For example, if the cost is obviously and directly associated with an easily measurable variable (Box 1, Q1), then the magnitude of the cost (Q2) is less important in determining whether it is a variable cost. Similarly, if the cost is significant (Q2), then it can still be a variable cost even though its association with a measurable variable is not as obvious and direct as some others (Q1).

5.12.1.1 Fixed Costs

The majority of the costs of Barnwell disposal site operations are fixed costs. Elements such as health and safety, security, licensing, environmental monitoring, training, administration, QA/QC, finance/accounting and

human resources, continue independent of the amount of waste arriving at the site. Fixed costs may change over time due to pay raises or supplier increases which are beyond control of the site operator.

The parties agreed that the costs identified as fixed costs would not change significantly with changes in waste volumes received. Independent review of the estimated fixed costs required to operate the Barnwell disposal site was performed by URS using the O&E Plan WBS, and the two estimates agreed to within about 5% as a result of collaborative discussions among the parties.

5.12.1.2 Variable Costs

The variable costs include certain materials costs and certain labor costs directly associated with the receipt and disposal of waste. The parties agreed that the costs identified as variable costs will likely decrease as the amount of waste received each year decreases in accordance with current statutes. The parties agreed that the methods already established by the Commission staff for determining the variable material cost rates (i.e., costs for concrete disposal vault purchases) are reasonable and appropriate and should remain in effect. As a result of the collaborative review process, the parties established variable waste dependent labor costs using information from the O&E Plan.

Variable Material (Vault) Costs

Variable material costs for vaults may be affected each year by such factors as the cost of each type of vault, the number of each type of vault used, the amount of trench space used (determined by the size, shape and type of waste container received and the number of vaults used in each trench). The method established for determining variable costs rates for vaults involves examination of the volume of waste received by waste classification (Class A, Class B, Class C and slit trench volume) and the volume of each waste classification disposed of in each respective trench. The total cost for vaults used in a trench divided by the total waste volume disposed in each trench provides a variable cost rate by trench.

Variable Waste Dependent Labor Costs

Variable waste dependent labor costs are included in the activities directly associated with waste acceptance, inspection and disposal. While the volume of waste in

various classifications has been useful in establishing variable cost rates for the material costs associated with vaults and trench amortization, variable labor rates can be more appropriately developed for specific work activities based on the following independent variables related to the amount of waste received for disposal:

- number of vaults used for disposal of waste
- number/type of shipments (vans, vertical casks, horizontal/slit trench casks)
- number of waste containers received

The labor costs associated with certain activities defined in various WBS elements described in the O&E Plan are directly related to the amount of waste received as measured or indicated by one of these independent variables. The parties further agreed that the labor rates for a specific WBS activity or a group of WBS elements should be based on different independent variables.

Other Variable Costs

The O&E Plan describes other variable costs (such as Atlantic Compact Commission surcharges, payments to the Decommissioning Trust Fund and the Perpetual Care and Maintenance Fund). These costs are established on a per-cubic-foot basis and are included in the statutory requirements for operating the disposal site.

5.12.1.3 Irregular Costs

Through collaborative review, the parties identified some costs that tend to be irregular as defined in Section 5.12.1. Examples of ongoing irregular costs include trench construction, license renewal, large component disposal, insurance premiums and surface water management improvements. Irregular costs can be tracked and controlled separately and are easily audited by the Commission staff in their annual audit. The site operator will request reimbursement with the allowed operating margin for irregular costs in the appropriate application to the Commission.

5.12.2 Use of the Operations and Efficiency Plan

The O&E Plan provides a structure for managing, analyzing and communicating information about costs associated with operating the Barnwell disposal site. The WBS section with its hierarchical structure and cost detail provides a framework to align the

company's accounting system to collect annual costs at a level of detail to allow better analysis. For fiscal year 2003/2004 and beyond, the accounting system can be aligned to accumulate costs in categories of fixed, variable and irregular costs consistent with agreements reached during the collaborative review. The O&E Plan also provides a logical method to communicate the various categories of costs incurred in operation of the Barnwell disposal site.

The Report of the Collaborative Review concludes that the method described for determining waste-dependent labor rates is a good approach. The parties participating in development of this approach requested the Commission use this method for determining allowable waste dependent labor costs for fiscal year 2003/2004 and beyond. Changes in the low-level radioactive waste disposal market or regulatory changes could cause the rates established by this collaborative effort to not accurately forecast costs. If such a situation were to occur, one or more of the parties would request a waste dependent labor rate change in accordance with S.C. Code Ann. 1976 Section 49-46-40(B)(4)(supp. 2002). A combination of the O&E Plan structure and actual costs would form the basis for such a request.

5.12.3 Recommendations of the Parties

Through the collaborative review process and use of the O&E Plan, the parties identified and developed four recommendations for the Commission's consideration. These recommendations are summarized below.

The parties established that the costs identified as "fixed costs" are valid costs of operating the Barnwell disposal site. The parties recommended that the Commission allow the operating company to be reimbursed for actual dollars spent plus, where applicable, the statutory operating margin for each of these identified fixed costs.

The costs identified as "variable costs" will vary with the amount of waste, type of shipments, and the number of containers received at the Barnwell disposal site. The variable costs include waste dependent labor and materials. The parties recommended that the Commission continue to use the previously accepted method of establishing material rates by waste classification for vault purchases and trench amortization. The parties also recommended that the Commission establish the waste dependent labor rates associated with each vault, van waste shipment, cask waste shipment, slit trench waste shipment, total shipments, and total containers received at the Barnwell disposal site.

The costs identified as "irregular costs" are likely to be different each year. The parties recommended that the Commission allow

the operating company to be reimbursed for actual dollars spent plus, where applicable, the statutory operating margin for each of these identified irregular costs.

The parties agreed that operating efficiencies are important to cost reduction efforts and that CNS should continue efforts to improve efficiencies in all aspects of operations.

5.12.4 Subsequent Audit and Commission Proceedings

Subsequent to the Collaborative Review of the OEP, an accounting audit conducted by the SC Office of Regulatory Staff (ORS) suggested refinement of the classification of certain specific costs as fixed or irregular.

6.0 LEAST COST OPERATING PLAN

Preparation of a 10-year least cost operating plan is directed by §48-46-40 (B) (6) of the 1976 SC Code of Laws (as amended). In this section, CNS provides financial projections along with assumptions and criteria used in developing the projections. CNS has estimated variable and irregular costs based on waste volume projections and anticipated schedules for special projects and trench construction.

Summary financial estimates for Fiscal Years 2005/2006 to 2014/2015 are provided and demonstrated to be consistent with the O&E Plan, the Report of the Collaborative Review and subsequent audit by the ORS. CNS also provides a discussion regarding operations during the in-region-only period and the potential impact of suspended operations.

6.1 Plan Criteria and Assumptions

Section 5 of this LCOP describes the current baseline requirements for Barnwell disposal operations. The functional areas required to operate a facility are not likely to change during the ten-year plan period, although resource requirements will change. The cost projections in this plan represent least costs developed in accordance with the O&E Plan, the Collaborative Review and subsequent accounting audits done in conjunction with Commission proceedings.

Revenue projections provided are dependent on the type and volume of waste received in a particular year. Waste received depends on disposal pricing, license revisions or modifications at other disposal sites and other regulatory or statutory conditions. CNS also recognizes that changing regulatory requirements or site conditions could affect future operating conditions. An opportunity to address changed conditions and new information is available since the LCOP is updated and resubmitted annually to the Commission.

CNS assumes four fundamental time periods during the remaining life of the disposal facility:

(1) Three remaining years of operation receiving low-level radioactive waste (LLRW) disposal volumes up to that allowed by §48-46-40 (B)(6) of the S.C. Code (as amended). This period extends from FY 2005/2006 through FY 2007/2008.

(2) Thirty years of operation as an "in-region-only" disposal facility. CNS assumes this period will end in 2038. The initial two years of this period (Phase I closure) will be used to complete closure activities on all parts of the disposal site except those areas required for in-region disposal operations. Phase I closure will be followed by a five-year post-closure observation period (Phase I post-closure) for closed parts of the site.

(3) Following in-region operations, one year will be devoted to in-region operations final closure (Phase II closure), and five years to in-region period final post-closure observation (Phase II post-closure).

(4) One hundred years of institutional control will follow the Phase II closure and post-closure periods. CNS assumes institutional control will end in 2144.

During the next three years of operations, CNS assumes that the site receives the waste volumes provided in Table 6.1.1-1 and that the basic operational approach remains essentially the same as current practice. With reduced waste volumes, variable costs of operations will decrease during this period assuming regulatory and environmental conditions at the site remain essentially the same.

During in-region-only operations, CNS estimates waste volumes at 8,000 ft^3 per year. The first fifteen months of the in-region-only operations period will consist of implementing Phase I closure activities as described above and in the 2005 Closure Plan and transitioning to a new mode of operations. A post-closure observation period of about five years will begin immediately after closure activities are complete and will run concurrently with in-region operations.

The final period, institutional control, begins following in-region-operations and its associated closure and post-closure periods. After DHEC approval of site closure and stabilization, the site property (which is leased from the State) will be transferred to the State. The SC B&CB will assume responsibility for the property and all buried materials. Their responsibilities will include site maintenance and monitoring paid from the Extended Care Maintenance Fund. During this period, the custodial agency may hire qualified contractors to maintain and monitor the site.

6.1.1 Waste Volume Projections

The types and volumes of waste received at the Barnwell facility directly affect disposal facility operations, schedules and revenue. Waste volume projections are shown in Table 6.1.1-1. §48-46-40 (A)(6) of the 1976 SC Code of Laws (as amended) establishes limits on waste volume that can be received at the disposal site for the next three years of disposal operations (FY 2005/2006 to 2007/2008). During the subsequent seven years of the 10-year planning period, waste may be received only from within the Atlantic Compact region. For this period, CNS estimates annual average waste receipts at 8,000 cubic feet.

Table 6.1.1-1
Projected Radioactive Waste Volumes

Fiscal Year	Maximum Allowed Volumes by Statute	Projected Waste Volume (ft^3)	Number of Slit Trench Shipments
2000/2001	160,000	125,989	43
2001/2002	80,000	57,763	11
2002/2003	70,000	65,660	14
2003/2004	60,000	59,515	23
2004/2005	50,000	43,260	23
2005/2006	45,000	38,800	19
2006/2007	40,000	37,200	18
2007/2008	35,000	32,000	20
2008/2009	NA	8,000	3
2009/2010	NA	8,000	3
2010/2011	NA	8,000	3
2011/2012	NA	8,000	3
2012/2013	NA	8,000	3
2013/2014	NA	8,000	3
2014/2015	NA	8,000	3

In Table 6.1.1-1, CNS has separately listed the projected number of slit trench shipments. These shipments, although representing a small fraction of total waste volume, are a significant revenue stream and require significant resources to prepare and offload. This data is significant also because the slit trench construction schedule is determined by the projected number of shipments rather than volume received.

6.1.2 Projected Trench Construction and Site Use

The projected volumes in Table 6.1.1-1 have been used along with data on recent trench usage to estimate trench construction requirements and land use for the plan period. CNS is currently operating in Trenches 86, 94 and Slit Trench 26. B/C Trench 97 has been constructed (and is in use for stormwater management purposes) but active disposal operations have not begun in this trench as of July 2005.

During the next three years, CNS anticipates needing nearly 900 feet of slit trench based on current disposal efficiencies. Four new slit trenches will be required to accommodate the projected number of shipments. The projected numbers of slit trench shipments for the next three years are based on the number of shipments received during FY 2003/2004 and FY 2004/2005 plus the expected need for non-Atlantic Compact generators to clean out their fuel pools prior to the beginning of the in-region operations period. Restricted budgets and outage schedules may cause a reduction in these projections.

CNS will not require a new Class A nor B/C style trench. Current active Class A Trench 86, B/C Trench 94 and B/C Trench 97 will provide sufficient disposal space for projected Class A and B/C waste. Future trench locations are shown on Drawing B-500-D-300. The total area required for new trenches constructed over the next three years is expected to be less than one-half acre.

During the in-region-only period, CNS anticipates shifting disposal operations to the large contiguous area designated as in-region operations area on Drawing B-500-D-300. Further evaluations will be required prior to selection of optimal trench designs for use during the in-region-only operations period. Preliminary plans are outlined in Section 7.0.

6.1.3 Other Disposal Operations Activities

In addition to the routine disposal operations activities and support described in Section 5, CNS anticipates that other disposal-related work will take place during the ten-year period. CNS foresees work and study in the following areas:

- Disposal operations practices and efficiencies
- Trench and vault design evaluations
- Environmental monitoring enhancements

CNS continues to evaluate its disposal practices and system designs to account for decreased waste volumes and changing types of waste received. CNS believes that during the in-region period, new trench designs and new modes of disposal operations such as described in Section 7.0 may be warranted. Any significant changes will require research, development, design work and approval to implement. Such costs are non-routine, but must be anticipated as the site transitions to in-region operations.

CNS also anticipates continued reviews by DHEC and other regulatory agencies of CNS' operations, including monitoring and maintenance programs. Based on our experience, CNS expects environmental monitoring program enhancements or special projects may be required periodically to address regulatory

questions or CNS findings. CNS has also embarked on activities aimed at optimizing the efficiency of environmental monitoring.

6.1.4 Decommissioning Tasks

The 2005 Closure Plan describes in detail the plan for facility decommissioning. The cost of facility decommissioning is fully funded through the Decommissioning Trust Fund.

In recent years, CNS has been implementing certain approved decommissioning related activities at the disposal site. During the next three years, CNS plans to continue such work in parallel with routine disposal operations. After three years and concurrent with the start of in-region operations, CNS plans to complete Phase I closure activities, leaving only the facilities and areas required for in-region operations. The five year post closure observation period begins immediately following Phase I closure. Significant activities of Phase I closure are briefly described below with details available in the 2005 Closure Plan.

6.1.4.1 Performance Objectives Verification

Prior to Phase I closure, CNS will develop a performance objectives verification plan to define the basis and criteria for meeting site performance objectives. During the Phase I closure, CNS will prepare performance objectives verification report(s) that will evaluate compliance with site performance objectives including updates to site radiological performance evaluation studies.

6.1.4.2 Enhanced Cap Construction

This activity involves the installation of multi-layer engineered cap on completed trenches at the facility. In FY 2003/2004, CNS completed the 17-acre Phase 6 cap enhancement. By the end of Phase I closure, CNS anticipates three additional phases of capping listed in Table 6.1.4.2-1. Existing and planned enhanced cap locations are shown on Drawing B-500-D-300.

Table 6.1.4.2-1
Ten-Year Plan Enhanced Capping Schedule

Cap Phase	Construction Start Date	Area (Acres)
7	2007	3.6
8	2008	5.9
9	2009	12.9
Total		22.4

6.1.4.3 Closure Surface Water Management

During fiscal year 2004/2005, CNS completed closure-related improvements to water management in the west drainage area. Remaining activities include additional surface water management design and construction for the southeast part of the disposal site and final grading activities within the west drainage area.

6.1.4.4 Facility Decontamination and Decommissioning

During the Phase I closure period, CNS will decommission all disposal site support facilities and equipment, except those needed for in-region operations, other parent company operations, or later use by the site custodian.

6.1.4.5 Ground Water Monitoring Plan and Well Abandonment

Based on on-going reviews of its operational environmental monitoring program, CNS anticipates adding and removing monitoring wells to enhance the program. As part of this effort, CNS plans to define the long-term post-closure groundwater monitoring plan. This planning effort as well as the addition or deletion of wells will be considered a cost of the operational environmental monitoring program until the start of Phase I closure. Such costs during the Phase I closure period, specific to long-term post-closure monitoring, will be considered a cost of decommissioning.

6.1.4.6 Final Site Survey

During Phase I closure, following final capping of completed trenches, CNS will undertake a radiological survey program to ensure that the site surface is free of contamination and that direct gamma radiation is essentially background.

6.2 Financial Evaluation

In this section, CNS provides a financial evaluation for the next ten years of Barnwell facility operations. The assessment is divided into two parts: (1) the next three years of operations under the statutory waste volume limits and (2) the remaining years as an in-region-only operating site.

Summary level estimates of revenue and costs for the plan period are presented in Table 6.2-1 and Figure 6.2-1. Also provided are the actual operating costs for FY2000/2001, FY2001/2002, FY 2002/2003 and FY

2003/2004. The actual costs shown in the table are consistent with the orders issued by the S.C. Public Service Commission (PSC).

Table 6.2-1
Revenue / Cost Summary

Fiscal Year[1]	Projected Volume	Gross Revenue[2] (in mill $)	Costs (in mill $)				Net Revenue (in mill $)[5]
			Allowable Operating Cost[3]	Operating Margin	Surcharges, Taxes, and Fees[4]	Total Operating Cost	
2000 / 2001	125,989	70.06	9.25	2.68	2.94	14.87	55.19
2001 / 2002	57,763	32.44	9.09	2.27	2.17	13.53	18.91
2002 / 2003	65,660	37.76	9.81	2.63	2.11	14.55	23.21
2003 / 2004	59,515	38.76	9.82	2.63	2.09	14.54	24.22
2004 / 2005	43,260	29.70	10.64	2.75	2.35	15.74	13.96
2005 / 2006	38,800	24.21	9.93	2.66	2.13	14.72	9.49
2006 / 2007	37,200	25.95	9.85	2.64	2.16	14.65	11.30
2007 / 2008	32,000	23.37	9.64	2.58	2.01	14.23	9.14
2008 / 2009	8,000	4.00	7.41	2.12	1.12	10.65	(6.65)
2009 / 2010	8,000	4.00	7.41	2.12	1.12	10.65	(6.65)
2010 / 2011	8,000	4.00	7.41	2.12	1.12	10.65	(6.65)
2011 / 2012	8,000	4.00	7.41	2.12	1.12	10.65	(6.65)
2012 / 2013	8,000	4.00	7.41	2.12	1.12	10.65	(6.65)
2013 / 2014	8,000	4.00	7.41	2.12	1.12	10.65	(6.65)
2014 / 2015	8,000	4.00	7.41	2.12	1.12	10.65	(6.65)

(1) Shown are actuals for FY 2000/2001, 2001/2002, 2002/2003 and 2003/2004 and estimated actuals for FY 2004/2005. The FY 2001/2002 actual includes intangible asset amortization for both FY 2000/2001 and FY 2001/2002.

(2) Gross revenue is the estimated total of all revenue for waste received for disposal. Projected revenue is in current dollars based on current revenue rate, recognizing that receipt of large components or special pricing may affect future actual revenue. Revenue amount also assumes competition in the Class B/C resin and filter market.

(3) Operating cost is the cost of disposal operations for which CNS receives 29% operating margin. Also included in this category are costs for intangible asset amortization and other costs identified as allowable by the Commission upon which no 29% margin is allowed. All estimates are in current dollars.

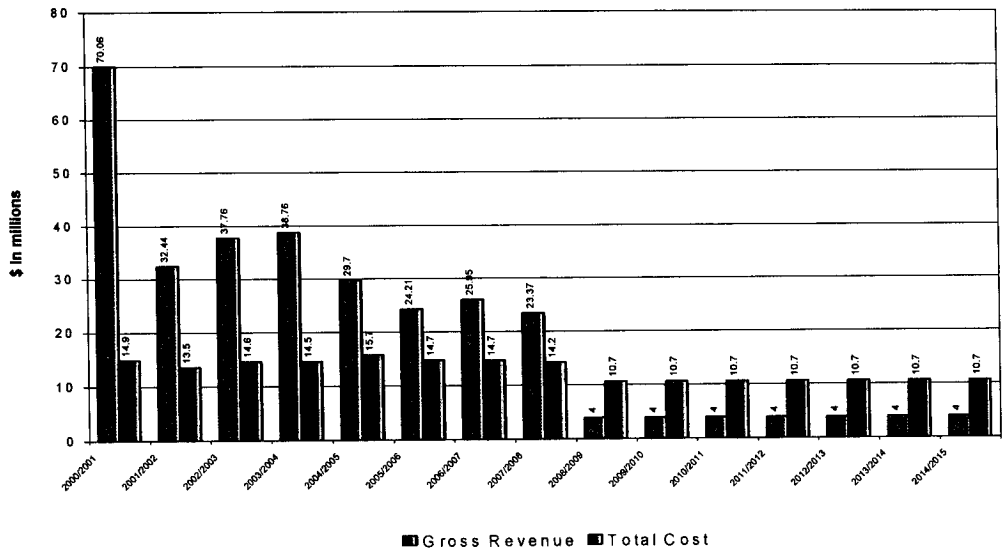
(4) Surcharges (for SCB&CB, Commission, etc.), taxes, and license fees related to disposal operations are allowable costs distributed from gross revenue.

(5) Net revenue to the State of South Carolina which includes money designated for Barnwell County and for South Carolina generator rebates. Interest accrued on cash flows is not included in this table. The deficits occurring after FY 2007/2008 may be mitigated by proposed actions described in Section 7.0.

6.2.1 Current Operations Period (FY 2005/2006 to FY 2007/2008)

Table 6.2-1 includes a projection of operating costs and revenue for the next three years of operations. These estimates have been developed incorporating recent actual costs of operating the Barnwell disposal site, which are consistent with agreements of the Collaborative Review of the O&E plan, audits by ORS and Commission orders. These estimates represent the best currently-available information. The financial projections show positive net revenue over the next three years assuming current Atlantic Compact and out-of-region price structures and projected waste volumes.

Figure 6.2-1
Gross Revenue/Cost Projections



6.2.2 In-Region-Only Operations (FY 2008/2009 to FY 2014/2015)

Beginning with fiscal year 2008/2009, CNS will accept waste only from the Atlantic Compact states (South Carolina, Connecticut and New Jersey). Based on recent historical data, CNS estimates average annual regional waste volume at approximately 8,000 ft^3. Similarly, recent historical data indicates a maximum of three slit trench offloads annually from generators in these three states. CNS assumes the "in-region-only" period will last thirty years, thereby encompassing current Atlantic Compact power plant decommissioning schedules. CNS has made no assumptions regarding increased waste volumes that might be expected from power-plant decommissionings.

For the in-region operations period, the O&E Plan presents an operations scenario comparable to CNS' current practice, with waste dependent costs reduced in direct proportion to expected waste volume reductions. The costs shown in Table 6.2-1 are based on recent actual costs of operations. Assuming the current operating approach, Table 6.2-1 shows a negative net revenue during in-region-only operations.

In order to operate a disposal facility at such low volumes for an extended period of time and to address revenue shortfalls, CNS recommends changing the fundamental operating approach. Adopting strategies like those described in Section 7 of this report could mitigate the negative net revenue. CNS also recommends evaluation of other appropriate and equitable funding for disposal site operations and maintenance activities occurring during the in-

region period, potentially lessening the effect of reduced gross revenue during this period.

CNS has identified on CNS Drawing B-500-D-300 in Appendix B an area for in-region operations, which should provide more than 800,000 ft^3 disposal capacity. The area is contiguous to but separate from other disposal areas, provides significant potential disposal capacity and is positioned to allow disposal of large component decommissioning waste. A limited operations area will require less maintenance costs to maintain offloading areas, to manage active trench water accumulation and to control runoff and erosion.

The closed portion of the site will also require routine maintenance. Also, the site monitoring program must continue throughout the in-region period.

In assessing potential in-region operating alternatives, CNS is considering the impact of operations on the in-region small volume waste generators with limited capability to store waste at their facilities. As an option, waste from these small generators could be stored for up to six months at the disposal site between periods of disposal operations. This ability to store waste at the disposal site would eliminate any adverse impact of modified site operations on small waste generators. Based on recent historical data small generators from the three compact states typically produce a total of less than 630 cubic feet of waste per year. Storage of these amounts for up to six months would have little or no impact on disposal operations or site maintenance.

6.3 Suspended Operations

CNS has evaluated the possibility of "suspended operations." Suspension of operations must be considered if "...the volume of waste disposed during a forthcoming period of time does not appear sufficient to generate receipts that will be adequate to reimburse the site operator and its operating margin". In such a case, CNS must provide to the SCB&CB plans for discontinuing acceptance of waste (suspension of operations).

Table 6.2-1 shows estimated operating costs versus projected revenue generated for each fiscal year of the ten-year period. For the next three years of the current planning period, CNS' evaluation found that for the projected waste volumes and under the current pricing structure, suspended operations will not be required.

For the in-region operations period, estimated annual operating costs will exceed revenue assuming current operating practices, recent cost experience and legislated in-region price caps. During this timeframe, the fixed costs required to keep the site in an operational mode with the ability to receive waste and maintain compliance with license requirements will

continue even during the time period that in-region waste volumes are accumulating. These costs will continue as long as the site remains operationally ready whether the waste volumes build to sufficient quantities to resume operations or not.

Therefore, under the requirements of the Atlantic Compact Law, CNS expects to notify the S.C. Budget and Control Board in 2008 that suspended operations will be required within the first year of in-region operations.

7.0 REVIEW OF ALTERNATIVES

Preceding sections of the LCOP describe historical, current and future operations of the LLRW disposal site. The LCOP describes changes and improvements in the site's regulations, design and operations. Historically, each enhancement to operations has involved careful consideration of alternatives, multiple technical and regulatory reviews and further refinement after implementation. To operate at the volumes currently estimated for in-region operations, CNS will likely need to modify its trench designs and disposal operations practices. The outlines of potential new operating scenarios, trench designs and financing methods are provided below. Alternative operational approaches will require further study, development and regulatory approval before implementation.

7.1 Trench Designs

The O&E Plan documents an evaluation of alternative vault and trench configurations for use at the Barnwell disposal site. It identifies potential "optimal" cost-effective designs appropriate to site and operating conditions. The evaluation demonstrates that current practice at the Barnwell disposal facility under current operating conditions is the most cost-effective of the alternatives identified. The findings also indicate that other alternatives may be required to operate at the low waste volumes projected during the in-region period. Based on CNS' evaluations, which include consideration of the O&E Plan, CNS believes that a modification to current trench configurations is warranted for low volume operations. Recommended trench designs are the following:

1. One standard trench design for disposal of all waste classes,
2. Continued use of the slit trench design for irradiated hardware, and
3. Waste-specific trench designs, as required, for large component or other unusual waste types that cannot be accommodated in the standard or slit trench.

The scenario proposed by CNS for future low volume operating conditions enhances compliance with license requirements while providing a practical and least cost alternative for site operations.

The standard trench design will replace the current Class A and B/C trench design types. The new standard trench is generally comparable to

the current B/C trench design but will be modified to accommodate all classes of waste and both cylindrical and rectangular vault types. The standard trench will be sized for up to a 3-vault width of cylindrical and rectangular vaults in a 2-tier arrangement. The trench size will be limited to minimize the potential for excessive trench water management. The length of the trench will be sized for the anticipated annual waste volume with some additional length for (1) stormwater management and (2) construction of trench extensions for future disposal, as needed, until the ultimate design length of the trench is achieved. The trench will be backfilled with free-flowing soil and covered first with initial clay cap and then final enhanced cap upon completion of an entire trench.

CNS recommends continued use of a design comparable to the current slit trench design for irradiated hardware. On a case-by-case basis, other waste-specific trench designs may be required for waste types that cannot be accommodated in the standard or slit trench (e.g. large component reactor waste).

CNS does not plan to modify vault designs because projected waste volumes are insufficient to justify the expense of significant vault design changes.

7.2 Organization and Personnel

Currently there are about 60 people performing the activities required to operate the disposal site for the volumes received during FY 2004/2005. For the most part the labor costs are in the fixed and irregular categories, with the variable labor decreasing as waste volumes decrease. The labor force is likely to decrease slightly over the next three years.

At the beginning of the in-region operations period, Phase I closure will also begin. The same management team and staff will perform and oversee closure activities and perform disposal operations. Site maintenance and monitoring will continue as outlined in Section 5.5. After the closure activities are complete, the post closure observation period begins and in-region operations continue. At the end of closure, management and staff personnel are expected to decrease to the levels required for continued operations and maintenance and monitoring of the closed site. Post-closure observation activities will also continue for the first few years of this period. A smaller, but versatile, crew is expected to be able to perform the required activities for maintenance, monitoring and operations through the post closure observation period and throughout the in-region operations period.

7.3 Campaign Style Operations

Another disposal operations scenario discussed in the O&E Plan is campaign style operations. This approach would involve intermittent waste receipt and disposal during the in-region operating period. Contacts

with customers could track the accumulation of wastes and schedules for transport and acceptance could be determined.

The base staff required to perform maintenance, monitoring and regulatory compliance functions could be augmented with additional personnel, as needed, for trench construction and vault preparation, waste receipt and inspection, cask handling and offloading, and trench backfilling after disposal.

This operating scenario will require additional study and evaluation and would require regulatory approvals before implementation. The requirements to keep the site in operational mode with the ability to receive waste and maintain compliance with license requirements would have to be agreed upon and costs estimated. Also, the costs of staff augmentation for the intermittent periods of waste disposal activities would have to be assessed.

7.4 Funding Alternatives

Certain ongoing maintenance and monitoring support costs will be required for the closed portions of the disposal site during in-region operations. These same activities will continue after the in-region operations period and throughout the institutional control period of the site. During the in-region period, some of these maintenance and monitoring costs are not directly associated with disposal operations and therefore only a portion of these costs should be considered operational costs. The remainder of these costs could be financed by the Decommissioning Trust Fund during the closure period and from the Extended Care Maintenance Fund thereafter. Such funding structure could reduce fixed costs carried by operations.

7.5 Conclusion

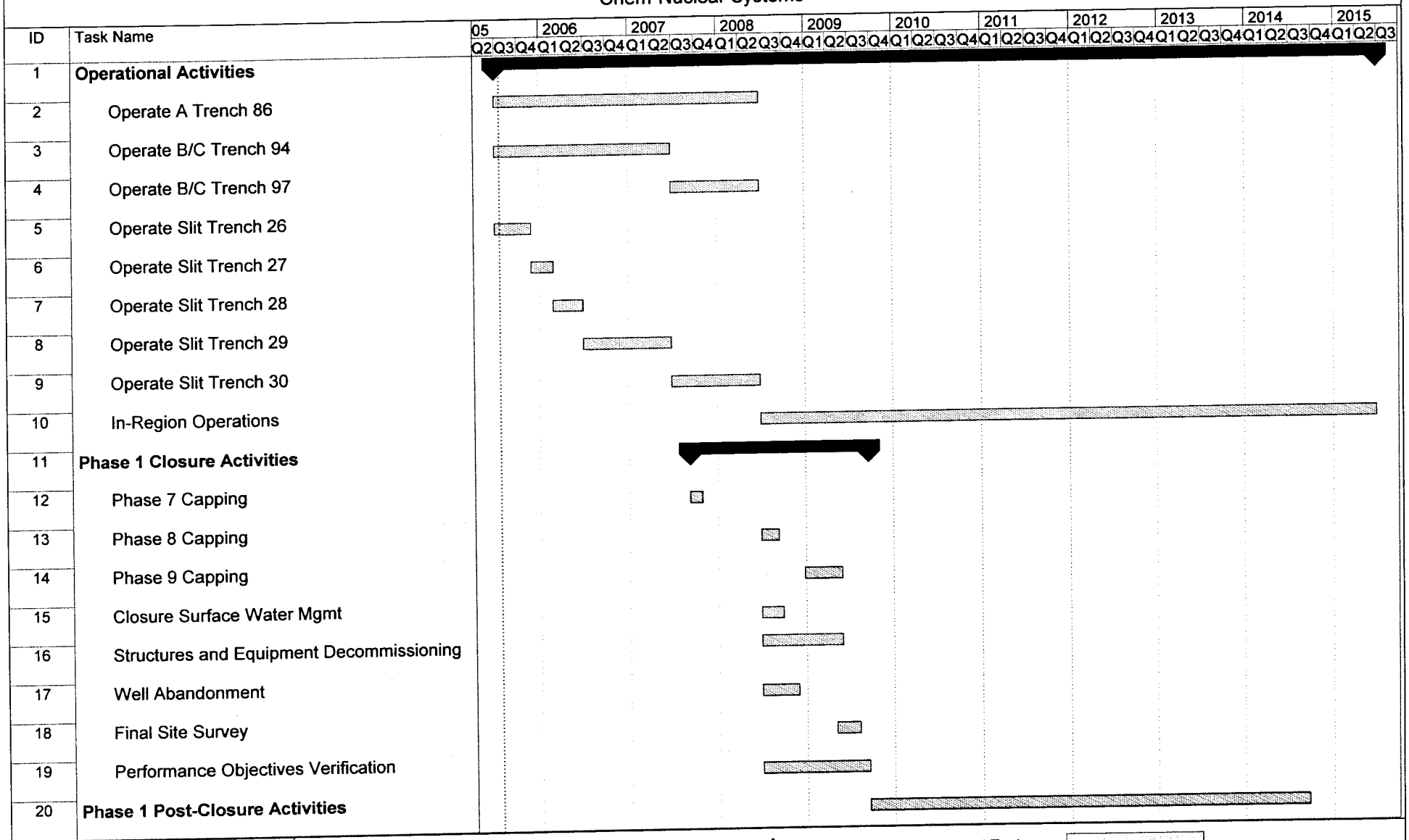
With streamlined staff and operational approach, and the financing of certain activities from other sources, the estimated cost of disposal operations to be reimbursed from the gross revenue on wastes being received during the in-region period can be reduced. To assess the feasibility and impact of such changes, further collaboration and agreement between affected parties will be required. Until such agreements are reached, current methods as described in Section 6 provide a reasonable basis for projections of revenue deficits beginning in FY 2008/2009.

It is clear that even with the least cost operating alternatives described above, the gross revenue from disposal of the expected in-region waste volumes is insufficient. Additional funding to support site operations could come from additional in-region wastes, revised in-region waste pricing, retention of the net revenue during the next three years of out-of-compact operations or additional funding from the State.

APPENDIX A

TEN-YEAR PLAN ACTIVITIES SCHEDULE

FY 2005/2006 Least Cost Operating Plan
Ten Year Schedule
Chem-Nuclear Systems



Project: LCOP05-06
Date: Mon 7/18/05

Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline

APPENDIX B

10 YEAR LAND UTILIZATION PLAN DRAWING

(B-500-D-300, REV. 4)